

0001

ASMB,R,B,L

\*\* NO ERRORS PASS#1 \*\*R1E ASMB 92067-16011\*\*

```
0001          ASMB,R,B,L
0002 00000      NAM JBINC,3
0003          EXT EXEC
0004*
0005* CLEARS JOB BINARY AREA
0006* (FRITZ JOERN )
0007*
0008 00000 177755 RCODE DEC -19
0009 00001 000006 CCODE DEC 6
0010 00002 000000 JBINC NOP
0011 00003 065020R      LDB =B101
0012 00004 002400      CLA
0013 00005 015001X      JSB EXEC      CLEAR JBINS
0014 00006 000010R      DEF **2
0015 00007 000000R      DEF RCODE
0016 00010 065021R      LDB =B102
0017 00011 002400      CLA
0018 00012 015001X      JSB EXEC      CLEAR JBINC
0019 00013 000015R      DEF **2
0020 00014 000000R      DEF RCODE
0021 00015 015001X      JSB EXEC
0022 00016 000020R      DEF **2
0023 00017 000001R      DEF CCODE
      00020 000101
      00021 000102
0024          END JBINC
** NO ERRORS *TOTAL **RTE ASMB 92067-16011**
```

0001

ASMB,R,B,L

\*\* NO ERRORS PASS#1 \*\*RTE ASMB 92067-16011\*\*

```

C001          ASMB,R,B,L
C002*
C003 00000          NAM BASIC
C004*
C005**
C006*****DUSM SUPER BASIC*****
C007**
C008*
C009**
C010***** SPECIAL SWITCH REGISTER FUNCTIONS
C011**
C012**
C013*      SW 15      1      ALL OUTPUT ON LINE PRINTER
C014*              0      ALL OUTPUT ON SYSTEM TTY
C015*      SW 14      1      TERMINATE EXECUTION OR LISTING
C016*      SW 13      1      DELETE ALL REMARKS
C017*
C018              COM PGPTR,PGPT1,PGPT2,PGPT,BGNPG
C019              COM PG1,PG2,PBUFF,PBPTR,FTRAK
C020              COM BFBL
C021*
C022*
C023*      PGPTR      TEMP VIRTUAL ADDRESS POINTER
C024*      PGPT1      PAGE 1 VIRTUAL ADDRESS POINTER
C025*      PGPT2      PAGE 2 VIRTUAL ADDRESS POINTER
C026*      PGPT      ADDRESS OF CURRENT PAGE POINTER
C027*      BGNPG      TEMP POINTER TO START OF CURRENT CORE RES. PAGE
C028*      PG1      START OF CORE PAGE #1
C029*      PG2      START OF CORE PAGE #2
C030*      PBUFF      FIRST WORD OF USERS PROGRAM
C031*      PBPTR      LAST WORD+1 OF USERS PROGRAM
C032*      FTRAK      START OF WORK AREA USED FOR IM CODE STORAGE
C033*      BFBL      CORE BUFFER LENGTH (MULTIPLE # OF SECTORS)
C034 00000 014607R LWBW DEF LWAMA
C035 00001 000000      BSS 1
C036 00002 000002 FWAM ABS 2      FIRST WORD PROGRAM MEMORY
C037 00003 077777 LWAM ABS 32767      LAST WORD PROGRAM MEMORY
C038 00004 000001C PT1 DEF PGPT1      ADDR OF V.A. POINTER FOR PAGE 1
C039 00005 000002C PT2 DEF PGPT2      ADDR OF V.A. POINTER FOR PAGE 2
C040 00006 000000 FCORE BSS 1      START OF FREE CORE
C041 00007 000000 FDISK BSS 1      START OF FREE DISK STORAGE
C042 00010 000000 SYMTB BSS 1      START OF SYMBOL TABLE
C043 00011 014751R SYMTA DEF SYMTB      SYMBOL TABLE END
C044 00012 000000 LSTAK BSS 1      LOW-CORE STACK ADDRESS
C045 00013 013313R ASBTB DEF FINIS
C046 00014 013313R SBIBB DEF FINIS
C047 00015 000000 OLDLN BSS 1      PREVIOUS LINE #
C048 00016 014751R .BUFA DEF SYMTB
C049 00017 000000 BADDR BSS 1      I/O BUFFER
C050 00020 000000 CCNT BSS 1      POINTERS
C051 00021 014610R SBUFA DEF SBUFB
C052 00022 000000 SBPTR BSS 1      SYNTAX BUFFER POINTER
C053 00023 000000 TFLAG BSS 1
C054 00024 000000 TTYFL BSS 1
C055 00025 000000 ENFLG BSS 1

```



|      |       |         |        |     |            |                             |
|------|-------|---------|--------|-----|------------|-----------------------------|
| C056 | 00026 | 000000  | TSIPT  | BSS | 1          | TEMPORARY STACK POINTER     |
| C057 | 00027 | 000000  | LSTPT  | BSS | 1          | LOW-CORE STACK POINTER      |
| C058 | 00030 | 000000  | HSTPT  | BSS | 1          | HIGH-CORE STACK POINTER     |
| C059 | 00031 | 000000  | PRA00  | BSS | 1          | PROGRAM EXECUTION           |
| C060 | 00032 | 000000  | NXTST  | BSS | 1          | SEQUENCING INFORMATION      |
| C061 | 00033 | 000000  | .LNUM  | BSS | 1          | CURRENT LINE NUMBER         |
| C062 | 00034 | 000000  | TYPE   | BSS | 1          | CURRENT STATEMENT TYPE      |
| C063 | 00035 | 000000  | DSTRT  | BSS | 1          | DATA                        |
| C064 | 00036 | 000000  | NXTDI  | BSS | 1          | STATEMENT                   |
| C065 | 00037 | 000000  | DCCNT  | BSS | 1          | POINTERS                    |
| C066 | 00040 | 000000  | RSYM   | BSS | 1          |                             |
| C067 | 00041 | 000000  | SIGN   | BSS | 1          |                             |
| C068 | 00042 | 000000  | EXP    | BSS | 1          |                             |
| C069 | 00043 | 000000  | XH     | BSS | 1          | RANDOM                      |
| C070 | 00044 | 000000  | XL     | BSS | 1          | VARIABLE                    |
| C071 | 00045 | 000000  | TEMPS  | BSS | 12         | TEMPORARIES                 |
| C072 | 00057 |         | MLBX1  | EQU | TEMPS+10   |                             |
| C073 | 00061 | 000000  | B1     | BSS | 2          |                             |
| C074 | 00063 | 000000  | B2     | BSS | 2          |                             |
| C075 | 00065 | 000000  | B3     | BSS | 2          |                             |
| C076 | 00067 | 011077R | .LOGA  | DEF | .LOG       |                             |
| C077 | 00070 | 015274R | EOF    | JSB | ERROR      |                             |
| C078 | 00071 | 015274R | NOEOF  | JSB | ERROR      |                             |
| C079 | 00072 | 010007R | EBUFA  | DEF | EBUFF      |                             |
| C080 | 00073 | 010012R | EBFA   | DEF | EBFF-1     |                             |
| C081 | 00074 | 010015R | LBUFA  | DEF | LBUFF      |                             |
| C082 | 00075 | 010021R | LNBF A | DEF | LNBF F-1   |                             |
| C083 | 00076 | 007673R | ERBS   | DEF | ERR-1      |                             |
| C084 | 00077 | 000100  | RECER  | DEF | RCERR-ERR  |                             |
| C085 | 00100 | 002225R | FOPBS  | DEF | QUOTE-2    |                             |
| C086 | 00101 | 103041R | STBAS  | DEF | SYNTB-26,I |                             |
| C087 | 00102 | 106114R | XECBR  | DEF | XECTB-26,I |                             |
| C088 | 00103 | 107111R | ARBAS  | DEF | AROTB-6,I  |                             |
| C089 | 00104 | 010024R | PDFBS  | DEF | PDFT-1     |                             |
| C090 | 00105 | 003765R | TBLAD  | DEF | SYCMD      |                             |
| C091 | 00106 | 004025R | STTYP  | DEF | LET        |                             |
| C092 | 00107 | 004106R | MATIO  | DEF | READ       |                             |
| C093 | 00110 | 004144R | MCBOP  | DEF | AND        |                             |
| C094 | 00111 | 004162R | PDFNS  | DEF | SIN        |                             |
| C095 | 00112 | 004223R | MATFN  | DEF | ZER        |                             |
| C096 | 00113 | 004054R | ANEXT  | DEF | NEXT       |                             |
| C097 | 00114 | 004067R | AEND   | DEF | END        |                             |
| C098 | 00115 | 004103R | ADATA  | DEF | DATA       |                             |
| C099 | 00116 | 004131R | ATHEN  | DEF | THEN       |                             |
| C100 | 00117 | 004134R | ATO    | DEF | TO         |                             |
| C101 | 00120 | 004136R | ASTEP  | DEF | STEP       |                             |
| C102 | 00121 | 004141R | ANOT   | DEF | NOT        |                             |
| C103 | 00122 | 004157R | ATAB   | DEF | TAB        |                             |
| C104 | 00123 | 000057R | MBXL   | DEF | MLBX1      |                             |
| C105 | 00124 | 013313R | BGNIB  | DEF | FINIS      | START OF CALL LINKAGE TABLE |
| C106 | 00125 | 013313R | ENDIB  | DEF | FINIS      | LAST WORD +1 OF CALL TABLE  |
| C107 | 00000 |         | A      | EQU | 0          |                             |
| C108 | 00001 |         | B      | EQU | 1          |                             |
| C109 | 00053 |         | .0     | EQU | 533        |                             |
| C110 | 00054 |         | .1     | EQU | .0+1       |                             |

|      |       |        |       |             |
|------|-------|--------|-------|-------------|
| C111 | 00055 | .2     | EQU   | .0+2        |
| C112 | 00056 | .3     | EQU   | .0+3        |
| C113 | 00057 | .4     | EQU   | .0+4        |
| C114 | 00060 | .5     | EQU   | .0+5        |
| C115 | 00061 | .6     | EQU   | .0+6        |
| C116 | 00062 | .7     | EQU   | .0+7        |
| C117 | 00063 | .8     | EQU   | .0+8        |
| C118 | 00064 | .9     | EQU   | .0+9        |
| C119 | 00065 | .10    | EQU   | .0+10       |
| C120 | 00126 | 000013 | .11   | DEC 11      |
| C121 | 00127 | 000014 | .12   | DEC 12      |
| C122 | 00130 | 000016 | .14   | DEC 14      |
| C123 | 00070 |        | .15   | EQU .0+13   |
| C124 | 00131 | 000022 | .18   | DEC 18      |
| C125 | 00132 | 000025 | .21   | DEC 21      |
| C126 | 00133 | 000026 | .22   | DEC 22      |
| C127 | 00134 | 000027 | .23   | DEC 23      |
| C128 | 00135 | 000032 | .26   | DEC 26      |
| C129 | 00136 | 000033 | .27   | DEC 27      |
| C130 | 00137 | 000034 | .28   | DEC 28      |
| C131 | 00140 | 000036 | .30   | DEC 30      |
| C132 | 00071 |        | .31   | EQU .0+14   |
| C133 | 00141 | 000040 | .32   | DEC 32      |
| C134 | 00142 | 000041 | .33   | DEC 33      |
| C135 | 00143 | 000042 | .34   | DEC 34      |
| C136 | 00144 | 000045 | .37   | DEC 37      |
| C137 | 00145 | 000050 | .40   | DEC 40      |
| C138 | 00146 | 000051 | .41   | DEC 41      |
| C139 | 00147 | 000053 | .43   | DEC 43      |
| C140 | 00150 | 000055 | .45   | DEC 45      |
| C141 | 00151 | 000054 | .44   | DEC 44      |
| C142 | 00152 | 000056 | .46   | DEC 46      |
| C143 | 00153 | 000057 | .47   | DEC 47      |
| C144 | 00154 | 000060 | .48   | DEC 48      |
| C145 | 00155 | 000061 | .49   | DEC 49      |
| C146 | 00156 | 000062 | .50   | DEC 50 ***: |
| C147 | 00157 | 000072 | .58   | DEC 58      |
| C148 | 00072 |        | .63   | EQU .0+15   |
| C149 | 00160 | 000100 | B100  | OCT 100     |
| C150 | 00161 | 000105 | E     | OCT 105     |
| C151 | 00162 | 000106 | F     | OCT 106     |
| C152 | 00163 | 000110 | .72   | DEC 72      |
| C153 | 00164 | 000112 | .74   | DEC 74      |
| C154 | 00165 | 000113 | .75   | DEC 75      |
| C155 | 00166 | 000116 | N     | OCT 116     |
| C156 | 00167 | 000123 | S     | OCT 123     |
| C157 | 00072 |        | B77   | EQU .63     |
| C158 | 00170 | 000133 | B133  | OCT 133     |
| C159 | 00171 | 000137 | B137  | OCT 137     |
| C160 | 00073 |        | B177  | EQU .0+16   |
| C161 | 00172 | 000200 | B200  | OCT 200     |
| C162 | 00173 | 000777 | MSK1A | OCT 777 ::: |
| C163 | 00074 |        | MSK0  | EQU .0+17   |
| C164 | 00174 | 000400 | B400  | OCT 400     |
| C165 | 00175 | 000776 | B776  | OCT 776     |

|      |       |        |        |     |        |    |
|------|-------|--------|--------|-----|--------|----|
| C166 | 00176 | 000377 | MSK1   | OCT | 377    | :: |
| C167 | 00177 | 001000 | B1000  | OCT | 1000   | :: |
| C168 | 00200 | 001400 | B1400  | OCT | 1400   | :: |
| C169 | 00201 | 003002 | SCCNT  | OCT | 3002   |    |
| C170 | 00202 | 002000 | B2000  | OCT | 2000   | :: |
| C171 | 00203 | 002400 | B2400  | OCT | 2400   | :: |
| C172 | 00204 | 005000 | B6000  | OCT | 6000   | :: |
| C173 | 00205 | 010400 | UNMNC  | OCT | 10400  | :: |
| C174 | 00206 | 011000 | B1100  | OCT | 11000  | :: |
| C175 | 00207 | 011400 | B1140  | OCT | 11400  | :: |
| C176 | 00210 | 020000 | B20K   | OCT | 20000  |    |
| C177 | 00211 | 016400 | DEFOP  | OCT | 16400  | :: |
| C178 | 00212 | 017000 | REMOP  | OCT | 17000  | :: |
| C179 | 00213 | 025000 | R00P   | OCT | 25000  | :: |
| C180 | 00214 | 031000 | WROP   | OCT | 31000  |    |
| C181 | 00215 | 025400 | PRNOP  | OCT | 25400  |    |
| C182 | 00216 | 005000 | LF     | OCT | 5000   |    |
| C183 | 00217 | 053146 | TENTH  | OCT | 53146  |    |
| C184 | 00220 | 077400 | OPMSK  | OCT | 77400  | :: |
| C185 | 00221 | 077600 | MSK4   | OCT | 77600  |    |
| C186 | 00222 | 077777 | INF    | OCT | 77777  |    |
| C187 | 00223 | 100007 | TYPEFL | OCT | 100007 |    |
| C188 | 00224 | 100017 | TABCN  | OCT | 100017 |    |
| C189 | 00225 | 100377 | OPDMK  | OCT | 100377 | :: |
| C190 | 00226 | 130000 | RMODE  | OCT | 130000 |    |
| C191 | 00227 | 140000 | UNNRM  | OCT | 140000 |    |
| C192 | 00230 | 174000 | HIMSK  | OCT | 174000 |    |
| C193 | 00231 | 100000 | N1     | DEC | -1.0   |    |
|      | 00232 | 000000 |        |     |        |    |
| C194 | 00052 |        | M1     | EQU | .0-1   |    |
| C195 | 00051 |        | M2     | EQU | .0-2   |    |
| C196 | 00050 |        | M3     | EQU | .0-3   |    |
| C197 | 00047 |        | M4     | EQU | .0-4   |    |
| C198 | 00046 |        | M5     | EQU | .0-5   |    |
| C199 | 00045 |        | M6     | EQU | .0-6   |    |
| C200 | 00044 |        | M7     | EQU | .0-7   |    |
| C201 | 00043 |        | M8     | EQU | .0-8   |    |
| C202 | 00042 |        | M9     | EQU | .0-9   |    |
| C203 | 00041 |        | M10    | EQU | .0-10  |    |
| C204 | 00233 | 177765 | M11    | DEC | -11    |    |
| C205 | 00234 | 177764 | M12    | DEC | -12    |    |
| C206 | 00235 | 177761 | M15    | DEC | -15    |    |
| C207 | 00236 | 177760 | M16    | DEC | -16    |    |
| C208 | 00237 | 177753 | M21    | DEC | -21    |    |
| C209 | 00240 | 177740 | M32    | DEC | -32    |    |
| C210 | 00241 | 177725 | D53    | OCT | -53    |    |
| C211 | 00242 | 177716 | D62    | OCT | -62    |    |
| C212 | 00243 | 177715 | D63    | OCT | -63    |    |
| C213 | 00244 | 177770 | SBCUN  | OCT | 177770 |    |
| C214 | 00245 | 100001 | STCON  | OCT | 100001 |    |
| C215 | 00246 | 177706 | D72    | OCT | -72    |    |
| C216 | 00077 |        | D100   | EQU | .0+20  |    |
| C217 | 00247 | 177670 | M72    | DEC | -72    |    |
| C218 | 00250 | 177667 | M73    | DEC | -73    |    |
| C219 | 00251 | 177664 | M76    | DEC | -76    |    |

|      |       |        |       |     |              |                           |
|------|-------|--------|-------|-----|--------------|---------------------------|
| 0220 | 00252 | 177645 | D133  | OCT | -153         |                           |
| 0221 | 00253 | 177600 | D200  | OCT | -200         |                           |
| 0222 | 00075 |        | M256  | EQU | .0+18        |                           |
| 0223 | 00254 | 177312 | M310  | DEC | -310         |                           |
| 0224 | 00255 | 176030 | M1000 | DEC | -1000        |                           |
| 0225 | 00256 | 100000 | MAXSN | DEC | -32768       |                           |
| 0226 | 00044 |        | MSK3  | EQU | M7           |                           |
| 0227 | 00257 | 043116 | FN    | ASC | 1, FN        |                           |
| 0228 | 00260 | 037440 | QMARK | ASC | 1, ?         |                           |
| 0229 | 00261 | 040000 | HALF  | OCT | 40000        |                           |
| 0230 | 00262 | 000000 |       | OCT | 0            |                           |
| 0231 | 00261 |        | HONE  | EQU | HALF         |                           |
| 0232 | 00263 | 100000 | MNEG  | OCT | 100000       | MAXIMUM NEGATIVE FLOATING |
| 0233 | 00264 | 000376 |       | OCT | 376          | POINT NUMBER              |
| 0234 | 00263 |        | FLGBT | EQU | MNEG         |                           |
| 0235 | 00265 | 102756 | MAXFX | DEC | -999999.5    |                           |
|      | 00266 | 002050 |       |     |              |                           |
| 0236 | 00267 | 114631 | MINFX | DEC | -0.099999959 |                           |
|      | 00270 | 116373 |       |     |              |                           |
| 0237 | 00271 | 000040 | BLANK | OCT | 40           |                           |
| 0238 | 00272 | 000000 | PARM  | BSS | 1            |                           |
| 0239 | 00273 | 177753 | TBLX  | DEC | -21          |                           |

## BASE PAGE SUBROUTINES

```

0241**
0242***  EMIT ERROR MESSAGE  **
0243**
0244 00274 000000 ERROR NOP
0245 00275 063741R LDA PRNTL          SHIFT TO
0246 00276 073131R STA LISTR          COMMAND MODE
0247 00277 062020R LDA CCNT          SAVE
0248 00300 073266R STA OPCHK          OUTPUT
0249 00301 062017R LDA BADDR          BUFFER
0250 00302 073321R STA RSCHK          POINTERS
0251 00303 062073R LDA EBFA          SET BUFFER
0252 00304 072017R STA BADDR          POINTER
0253 00305 060063 LDA .8          SET CHARACTER
0254 00306 072020R STA CCNT          COUNT
0255 00307 065274R LDB ERROR          ERROR SOURCE IN (B)
0256 00310 062076R LDA ERBS          ERROR ADDRESS IN (A)
0257 00311 002004 INA          MOVE TO NEXT ERROR
0258 00312 154000 CPB 0,1          SAME AS ACTUAL ERROR?
0259 00313 003005 CMA,INA,RSS        YES
0260 00314 025311R JMP *-3          NO
0261 00315 042076R ADA ERBS          COMPUTE ERROR
0262 00316 073426R STA ENOUT          SAVE NEGATIVE OF ERROR
0263 00317 003004 CMA,INA          NUMBER
0264 00320 017132R JSB OUTIN          NUMBER TO BUFFER
0265 00321 065072R LDB EBUFA          LOAD BUFFER ADDRESS
0266 00322 062020R LDA CCNT          LOAD NEGATIVE OF
0267 00323 017161R JSB EXECW          OUTPUT ERROR MESSAGE
0268 00324 062075R LDA LNBFA          OUTPUT
0269 00325 072017R STA BADDR
0270 00326 060065 LDA .10
0271 00327 072020R STA CCNT          LINE
0272 00330 062033R LDA .LNUM
0273 00331 017132R JSB OUTIN
0274 00332 065074R LDB LBUFA          NUMBER
0275 00333 062020R LDA CCNT
0276 00334 017161R JSB EXECW
0277 00335 063426R LDA ENOUT          RETRIEVE NEGATIVE OF ERROR
0278 00336 042077R ADA RECER          RECOVERABLE
0279 00337 002021 SSA,RSS
0280 00340 027611R JMP PEXMK        NO, RETURN TO SYNTAX MODE
0281 00341 040061 ADA .6
0282 00342 002020 SSA
0283 00343 025340R JMP *-3
0284 00344 062226R LDA RMODE          RETURN TO
0285 00345 073131R STA LISTR          RUN MODE
0286 00346 063266R LDA OPCHK          RESTORE
0287 00347 072020R STA CCNT          OUTPUT
0288 00350 063321R LDA RSCHK          BUFFER
0289 00351 072017R STA BADDR          POINTERS
0290 00352 126274R JMP ERROR,I      RETURN TO PROGRAM

```

## BASE PAGE SUBROUTINES

C292\*\*

C293\*\*\* MOVE WORDS TO HIGHER DISK

C294\*\*

|      |       |         |       |         |                      |
|------|-------|---------|-------|---------|----------------------|
| C295 | 00353 | 000000  | MVTOH | NOP     |                      |
| C296 | 00354 | 066050R | LDB   | TEMP2   | FETCH SOURCE ADDRESS |
| C297 | 00355 | 056051R | MVTO1 | CPB     | TEMP3                |
|      |       |         |       |         | ALL RELOCATION DONE? |
| C298 | 00356 | 126353R | JMP   | MVTOH,I | YES, EXIT            |
| C299 | 00357 | 003400  | CCA   |         | BACK UP              |
| C300 | 00360 | 042052R | ADA   | TEMP4   | SOURCE AND           |
| C301 | 00361 | 072052R | STA   | TEMP4   | .DESTINATION         |
| C302 | 00362 | 044052  | ADB   | M1      | ADDRESSES            |
| C303 | 00363 | 017051R | JSB   | LDBI    | MOVE WORD            |
| C304 | 00364 | 017151R | JSB   | DSTOR   | WORD                 |
| C305 | 00365 | 000052R | DEF   | TEMP4   |                      |
| C306 | 00366 | 026355R | JMP   | MVTO1   |                      |

C307\*\*

C308\*\*\* MOVE WORDS TO HIGHER CORE

C309\*\*

|      |       |         |       |         |
|------|-------|---------|-------|---------|
| C310 | 00367 | 000000  | MVTOC | NOP     |
| C311 | 00370 | 066050R | LDB   | TEMP2   |
| C312 | 00371 | 056051R | MVT1  | CPB     |
|      |       |         |       | TEMP3   |
| C313 | 00372 | 126367R | JMP   | MVTOC,I |
| C314 | 00373 | 003400  | CCA   |         |
| C315 | 00374 | 042052R | ADA   | TEMP4   |
| C316 | 00375 | 072052R | STA   | TEMP4   |
| C317 | 00376 | 044052  | ADB   | M1      |
| C318 | 00377 | 160001  | LDA   | 1,I     |
| C319 | 00400 | 172052R | STA   | TEMP4,I |
| C320 | 00401 | 026371R | JMP   | MVT1    |

C321\*\*

C322\*\*\* INPUT A CONSTANT \*\*

C323\*\*

|      |       |         |         |         |                        |
|------|-------|---------|---------|---------|------------------------|
| C324 | 00402 | 000000  | CONST   | NOP     |                        |
| C325 | 00403 | 017377R | JSB     | GETCR   |                        |
| C326 | 00404 | 126402R | JMP     | CONST,I |                        |
| C327 | 00405 | 005400  | CLB     |         | SET SIGN               |
| C328 | 00406 | 076041R | STB     | SIGN    | POSITIVE               |
| C329 | 00407 | 006004  | INB     |         |                        |
| C330 | 00410 | 052147R | CPA     | .43     | '+' ?                  |
| C331 | 00411 | 026415R | JMP     | CONS1   | YES                    |
| C332 | 00412 | 052150R | CPA     | .45     | NO, '-' ?              |
| C333 | 00413 | 007401  | CCB,RSS |         | YES                    |
| C334 | 00414 | 026420R | JMP     | CONS2   | NO                     |
| C335 | 00415 | 076041R | CONS1   | STB     | SIGN                   |
|      |       |         |         |         | RECORD SIGN            |
| C336 | 00416 | 017377R | JSB     | GETCR   | FETCH NEXT             |
| C337 | 00417 | 026426R | JMP     | SYE12-1 | CHARACTER              |
| C338 | 00420 | 016430R | CONS2   | JSB     | NUMCK                  |
|      |       |         |         |         | FETCH CONSTANT         |
| C339 | 00421 | 026424R | JMP     | CONS3   | NONE FOUND             |
| C340 | 00422 | 036402R | ISZ     | CONST   | SUCCESSFULLY FOUND,    |
| C341 | 00423 | 126402R | JMP     | CONST,I | EXIT VIA (P+2)         |
| C342 | 00424 | 056041R | CONS3   | CPB     | SIGN                   |
|      |       |         |         |         | SIGN FOUND? ( (B) = 0) |
| C343 | 00425 | 003401  | CCA,RSS |         | NO                     |
| C344 | 00426 | 016274R | JSB     | ERROR   | YES, SOLITARY SIGN     |
| C345 | 00427 | 126402R | SYE12   | JMP     | CONST,I                |
|      |       |         |         |         | EXIT VIA (P+1)         |

C346\*\*

## BASE PAGE SUBROUTINES

```

C347***  FETCH NUMBER AND CONVERT TO BINARY  **
C348**
C349  00430  000000  NUMCK  NOP          CHARACTER IN (A), SIGN SET
C350  00431  005400          CLB
C351  00432  075042R          STB EXP      ZERO
C352  00433  077066R          STB MANT1    ALL
C353  00434  077130R          STB MANT2    COMPONENTS
C354  00435  077366R          STB EXPON    OF NUMBER
C355  00436  075051R          STB TEMP3    SET 'NUMBER' FLAG FALSE
C356  00437  007400          CCB          SET 'DECIMAL POINT'
C357  00440  077416R          STB DPFLG    FLAG FALSE
C358  00441  052152R  NUMC1  CPA .46      DECIMAL POINT?
C359  00442  037416R          ISZ DPFLG    YES, SET FLAG TRUE
C360  00443  026447R          JMP NUMC2    NO
C361  00444  002400          CLA          INITIALIZE POST-DECIMAL DIGIT
C362  00445  073366R          STA EXPON    DIGIT COUNTER TO ZERO
C363  00446  026466R          JMP NUMC3+1  FETCH A CHARACTER
C364  00447  017353R  NUMC2  JSB DIGCK    DIGIT?
C365  00450  025521R          JMP NUMC7    NO
C366  00451  037366R          ISZ EXPON    YES, COUNT DIGIT
C367  00452  001727          ALF,ALF      LEFT-JUSTIFY
C368  00453  001723          ALF,RAR      DIGIT AND
C369  00454  072052R          STA TEMP4    SAVE IT
C370  00455  016777R          JSB MBY10   MULTIPLY PREVIOUS NUMBER BY 10
C371  00456  065042R          LDB EXP
C372  00457  005002          SZB          ZERO EXPONENT?
C373  00460  026472R          JMP NUMC4    NO
C374  00461  060057          LDA .4       YES, SET
C375  00462  072042R          STA EXP      EXPONENT TO 4
C376  00463  062052R          LDA TEMP4    LOAD
C377  00464  005400          CLB          NUMBER
C378  00465  016742R  NUMC3  JSB NORML    NORMALIZE THE NUMBER
C379  00466  035051R          ISZ TEMP3    SET 'NUMBER OCCURRED' FLAG
C380  00467  017377R          JSB GETCR    ANOTHER CHARACTER?
C381  00470  025570R          JMP NUM12    NO
C382  00471  026441R          JMP NUMC1    YES
C383  00472  044047  NUMC4  ADB M4        COMPUTE
C384  00473  007000          CMB          EXPONENT
C385  00474  062052R          LDA TEMP4    BIAS AND
C386  00475  075052R          STB TEMP4    SAVE IT
C387  00476  005400          CLB
C388  00477  035052R  NUMC5  ISZ TEMP4    DIGIT POSITIONED?
C389  00500  025516R          JMP NUMC6    NO
C390  00501  000040          CLE          YES, ADD IN
C391  00502  047130R          ADB MANT2    LOW PART
C392  00503  103101          CLO          OF NUMBER
C393  00504  002040          SEZ          OVERFLOW?
C394  00505  002004          INA          YES, BUMP (A)
C395  00506  043066R          ADA MANT1    ADD IN HIGH PART OF NUMBER
C396  00507  102301          SOS          OVERFLOW?
C397  00510  026465R          JMP NUMC3    NO
C398  00511  000065          CLE,ERA      YES, ROTATE
C399  00512  005500          ERB          DOWN AND
C400  00513  035042R          ISZ EXP      BUMP
C401  00514  000000          NOP          EXPONENT

```

## BASE PAGE SUBROUTINES

|      |       |         |                 |                           |
|------|-------|---------|-----------------|---------------------------|
| 0402 | 00515 | 026465R | JMP NUMC3       |                           |
| 0403 | 00516 | 000065  | NUMC6 CLE,ERA   | SHIFT                     |
| 0404 | 00517 | 005500  | ERB             | DIGIT                     |
| 0405 | 00520 | 026477R | JMP NUMC5       | RIGHT                     |
| 0406 | 00521 | 006400  | NUMC7 CLB       | DECIMAL POINT             |
| 0407 | 00522 | 076052R | STB TEMP4       |                           |
| 0408 | 00523 | 056051R | CPB TEMP3       | OR DIGIT FOUND?           |
| 0409 | 00524 | 126430R | JMP NUMCK,I     | NO, EXIT VIA (P+1)        |
| 0410 | 00525 | 052161R | CPA E           | YES, 'E' ?                |
| 0411 | 00526 | 002001  | RSS             | YES                       |
| 0412 | 00527 | 026570R | JMP NUM12       | NO, NO EXPONENT PART      |
| 0413 | 00530 | 017377R | JSB GETCR       |                           |
| 0414 | 00531 | 016274R | NUMER JSB ERROR |                           |
| 0415 | 00532 | 052147R | CPA .43         | '+' ?                     |
| 0416 | 00533 | 026540R | JMP NUMC8       | YES                       |
| 0417 | 00534 | 052150R | CPA .45         | NO, '-' ?                 |
| 0418 | 00535 | 003401  | CCA,RSS         | YES                       |
| 0419 | 00536 | 026542R | JMP NUMC9       | NO                        |
| 0420 | 00537 | 072052R | STA TEMP4       | NOTE MINUS SIGN           |
| 0421 | 00540 | 017377R | NUMC8 JSB GETCR |                           |
| 0422 | 00541 | 026531R | JMP NUMER       |                           |
| 0423 | 00542 | 017353R | NUMC9 JSB DIGCK | DIGIT?                    |
| 0424 | 00543 | 026531R | JMP NUMER       | NO                        |
| 0425 | 00544 | 072051R | STA TEMP3       | YES, SAVE IT              |
| 0426 | 00545 | 017377R | JSB GETCR       |                           |
| 0427 | 00546 | 026564R | JMP NUM10       | SECOND                    |
| 0428 | 00547 | 017353R | JSB DIGCK       | DIGIT?                    |
| 0429 | 00550 | 026564R | JMP NUM10       | NO                        |
| 0430 | 00551 | 066051R | LDB TEMP3       | YES                       |
| 0431 | 00552 | 005020  | BLS,BLS         | MULTIPLY                  |
| 0432 | 00553 | 046051R | ADB TEMP3       | PRIOR DIGIT               |
| 0433 | 00554 | 005000  | BLS             | BY 10                     |
| 0434 | 00555 | 040001  | ADA 1           | ADD NEW DIGIT             |
| 0435 | 00556 | 072051R | STA TEMP3       | SAVE EXPONENT             |
| 0436 | 00557 | 017377R | JSB GETCR       |                           |
| 0437 | 00560 | 026564R | JMP NUM10       | THIRD                     |
| 0438 | 00561 | 017353R | JSB DIGCK       | DIGIT?                    |
| 0439 | 00562 | 002001  | RSS             | NO                        |
| 0440 | 00563 | 026531R | JMP NUMER       | YES                       |
| 0441 | 00564 | 062051R | NUM10 LDA TEMP3 | LOAD EXPONENT             |
| 0442 | 00565 | 036052R | ISZ TEMP4       | POSITIVE?                 |
| 0443 | 00566 | 003004  | CMA,INA         | YES, COMPLEMENT IT        |
| 0444 | 00567 | 002001  | RSS             | NO                        |
| 0445 | 00570 | 002400  | NUM12 CLA       | CLEAR IF NO EXPONENT PART |
| 0446 | 00571 | 037416R | ISZ DPFLG       | DECIMAL POINT?            |
| 0447 | 00572 | 043366R | ADA EXPON       | YES, CORRECT EXPONENT     |
| 0448 | 00573 | 002003  | SZA,RSS         | ZERO EXPONENT?            |
| 0449 | 00574 | 026611R | JMP NUM14       | YES                       |
| 0450 | 00575 | 002020  | SSA             | NO, NEGATIVE EXPONENT?    |
| 0451 | 00576 | 026605R | JMP NUM13       | NO                        |
| 0452 | 00577 | 003004  | CMA,INA         | YES, SET                  |
| 0453 | 00600 | 073366R | STA EXPON       | COUNTER                   |
| 0454 | 00601 | 017030R | JSB DBY10       | DIVIDE NUMBER BY 10       |
| 0455 | 00602 | 037366R | ISZ EXPON       | DONE?                     |
| 0456 | 00603 | 026601R | JMP *-2         | NO                        |



## BASE PAGE SUBROUTINES

```

C457 00604 025611R      JMP NUM14      YES
C458 00605 073366R NUM13 STA EXPON      SET COUNTER
C459 00606 015777R      JSB MBY10      MULTIPLY BY 10
C460 00607 037366R      ISZ EXPON      DONE?
C461 00610 025606R      JMP *-2        NO
C462 00611 063066R NUM14 LDA MANT1      YES, LOAD
C463 00612 067130R      LDB MANT2      NUMBER
C464 00613 035041R      ISZ SIGN      POSITIVE?
C465 00614 025620R      JMP NUM15      YES
C466 00615 003000      CMA              NO,
C467 00616 007007      CMB,INB,SZB,RSS  COMPLEMENT
C468 00617 002004      INA              IT
C469 00620 015647R NUM15 JSB .PACK      PACK NUMBER INTO (A) AND (B)
C470 00621 104400      DST SVOP1
      00622 015316R
C471 00623 062022R      LDA SBPTR
C472 00624 002020      SSA
C473 00625 025642R      JMP NUM17
C474 00626 104200      DLD SVOP1
      00627 015316R
C475 00630 035022R      ISZ SBPTR
C476 00631 172022R      STA SBPTR,I      STORE
C477 00632 035022R      ISZ SBPTR      NUMBER IN
C478 00633 175022R      STB SBPTR,I      PROPER
C479 00634 035022R      ISZ SBPTR      LOCATION
C480 00635 017416R NUM16 JSB BCKSP      FETCH
C481 00636 017377R      JSB GEICR      FIRST
C482 00637 060065      LDA .10        UNUSED CHARACTER
C483 00640 035430R      ISZ NUMCK      RETURN
C484 00641 125430R      JMP NUMCK,I      VIA (P+2)
C485 00642 104200 NUM17 DLD SVOP1
      00643 015316R
C486 00644 017342R      JSB DDST
C487 00645 000022R      DEF SBPTR
C488 00646 025635R      JMP NUM16
C489**
C490*** NORMALIZE AND PACK FLOATING POINT NUMBER **
C491**
C492 00647 000000 .PACK NOP      MANTISSA IN (A) AND (B),
C493 00650 015742R      JSB NORML      EXPONENT IN EXP, (E) CLEARED
C494 00651 002103      CLE,SZA,RSS    ZERO RESULT?
C495 00652 125647R      JMP .PACK,I    YES
C496 00653 044073      ADB B177      NO, ROUND
C497 00654 002021      SSA,RSS        POSITIVE NUMBER?
C498 00655 005004      INB            YES, FINISH ROUND
C499 00656 103101      CLO
C500 00657 002040      SEZ            OVERFLOW FROM (B)?
C501 00660 002104      CLE,INA        YES, BUMP (A)
C502 00661 102301      SOS            OVERFLOW? (A=100000, B=0)
C503 00662 001200      RAL
C504 00663 002031      SSA,SLA,RSS    TWO HIGH BITS 1'S? (A=140000)
C505 00664 025667R      JMP PACK1     NO
C506 00665 002300      CCE            YES
C507 00666 001130      APS,SLA,ALS    SET (A) =100000 AND SKIP
C508 00667 001300 PACK1 RAR          COUNTERPART TO *-5

```

## BASE PAGE SUBROUTINES

|         |                             |         |                 |                           |
|---------|-----------------------------|---------|-----------------|---------------------------|
| C509    | 00670                       | 072777R | STA MBY10       | SAVE (A)                  |
| C510    | 00671                       | 060001  | LDA 1           | DELETE 8 LOW              |
| C511    | 00672                       | 010075  | AND M256        | ORDER BITS OF MANTISSA    |
| C512    | 00673                       | 070001  | STA 1           | SAVE LOWER MANTISSA       |
| C513    | 00674                       | 062042R | LDA EXP         | FETCH EXPONENT            |
| C514    | 00675                       | 002040  | SEZ             | DECREMENT EXPONENT?       |
| C515    | 00676                       | 040052  | ADA M1          | YES                       |
| C516    | 00677                       | 102201  | SUC             | NO, PRIOR OVERFLOW?       |
| C517    | 00700                       | 002004  | INA             | YES, INCREMENT EXPONENT   |
| C518    | 00701                       | 042172R | ADA B200        | NO, EXPONENT              |
| C519    | 00702                       | 002020  | SSA             | UNDERFLOW?                |
| C520    | 00703                       | 025722R | JMP PACK3       | YES                       |
| C521    | 00704                       | 040075  | ADA M256        | NO, EXPONENT              |
| C522    | 00705                       | 002021  | SSA, RSS        | OVERFLOW?                 |
| C523    | 00706                       | 025726R | JMP PACK4       | YES                       |
| C524    | 00707                       | 042172R | ADA B200        | NO, RESTORE EXPONENT,     |
| C525    | 00710                       | 001200  | RAL             | POSITION SIGN,            |
| C526    | 00711                       | 010074  | AND MSK0        | MASK TO 8 BITS, AND       |
| C527    | 00712                       | 044000  | ADB 0           | COMBINE WITH LOW MANTISSA |
| C528    | 00713                       | 062777R | LDA MBY10       | RETRIEVE HIGH MANTISSA    |
| C529    | 00714                       | 052263R | CFA MNEG        |                           |
| C530    | 00715                       | 002001  | RSS             | NEGATIVE                  |
| C531    | 00716                       | 125647R | JMP .PACK, I    |                           |
| C532    | 00717                       | 055264R | CPB MNEG+1      | OVERFLOW?                 |
| C533    | 00720                       | 025726R | JMP PACK4       | YES                       |
| C534    | 00721                       | 125647R | JMP .PACK, I    | NO                        |
| C535    | 00722                       | 015274R | PACK3 JSB ERROR |                           |
| C536    | 00723                       | 002400  | UNDER CLA       | ZERO RESULT               |
| C537    | 00724                       | 005400  | CLB             | ON UNDERFLOW              |
| C538    | 00725                       | 125647R | JMP .PACK, I    |                           |
| C539    | 00726                       | 015274R | PACK4 JSB ERROR |                           |
| C540    | 00727                       | 062777R | OVRER LDA MBY10 |                           |
| C541    | 00730                       | 015732R | JSB OVFLW       |                           |
| C542    | 00731                       | 125647R | JMP .PACK, I    |                           |
| C543**  |                             |         |                 |                           |
| C544*** | LOAD INFINITY ON OVERFLOW   | **      |                 |                           |
| C545**  |                             |         |                 |                           |
| C546    | 00732                       | 000000  | OVFLW NOP       |                           |
| C547    | 00733                       | 064051  | LDB M2          | LOAD                      |
| C548    | 00734                       | 002020  | SSA             | APPROPRIATE               |
| C549    | 00735                       | 065175R | LDB B776        | LOW MANTISSA              |
| C550    | 00736                       | 032222R | IOR INF         | LOAD                      |
| C551    | 00737                       | 002020  | SSA             | APPROPRIATE               |
| C552    | 00740                       | 062263R | LDA MNEG        | HIGH MANTISSA             |
| C553    | 00741                       | 125732R | JMP OVFLW, I    |                           |
| C554**  |                             |         |                 |                           |
| C555*** | NORMALIZE (A), (B), AND EXP | **      |                 |                           |
| C556**  |                             |         |                 |                           |
| C557    | 00742                       | 000000  | NORML NOP       | SET                       |
| C558    | 00743                       | 072777R | STA MBY10       | LEFT-SHIFT                |
| C559    | 00744                       | 002400  | CLA             | COUNTER                   |
| C560    | 00745                       | 072776R | SIA MPY         | TO ZERO                   |
| C561    | 00746                       | 062777R | LDA MBY10       |                           |
| C562    | 00747                       | 002003  | SZA, RSS        | ON                        |
| C563    | 00750                       | 005002  | SZB             | ZERO                      |

## BASE PAGE SUBROUTINES

|                                           |       |         |               |                                 |
|-------------------------------------------|-------|---------|---------------|---------------------------------|
| C564                                      | 00751 | 025757R | JMP NORM3     | CLEAR                           |
| C565                                      | 00752 | 072042R | STA EXP       | EVERYTHING                      |
| C566                                      | 00753 | 073066R | STA MANT1     | STORE                           |
| C567                                      | 00754 | 077130R | STB MANT2     | MANTISSA                        |
| C568                                      | 00755 | 125742R | JMP NORM1,I   | AND RETURN                      |
| C569                                      | 00756 | 035776R | NORM2 ISZ MPY | COUNT LEFT SHIFTS               |
| C570                                      | 00757 | 004066  | NORM3 CLE,ELB | ROTATE (A) AND                  |
| C571                                      | 00760 | 001600  | ELA           | (B) LEFT INTO (E)               |
| C572                                      | 00761 | 002061  | SEZ,SSA,RSS   | TWO HIGHEST BITS 0?             |
| C573                                      | 00762 | 025756R | JMP NORM2     | YES, + UNNORMALIZED             |
| C574                                      | 00763 | 002060  | SEZ,SSA       | NO, TWO HIGHEST BITS 1?         |
| C575                                      | 00764 | 025756R | JMP NORM2     | YES, - UNNORMALIZED             |
| C576                                      | 00765 | 001500  | ERA           | SHIFT TO                        |
| C577                                      | 00766 | 005540  | ERB,CLE       | NORMALIZE MANTISSA              |
| C578                                      | 00767 | 073066R | STA MANT1     | NO,                             |
| C579                                      | 00770 | 062776R | LDA MPY       | COMPUTE                         |
| C580                                      | 00771 | 003004  | CMA,INA       | CORRECTED                       |
| C581                                      | 00772 | 042042R | ADA EXP       | EXPONENT                        |
| C582                                      | 00773 | 072042R | STA EXP       | VALUE                           |
| C583                                      | 00774 | 063066R | LDA MANT1     |                                 |
| C584                                      | 00775 | 025754R | JMP NORM1     |                                 |
| C585                                      | 00776 | 000000  | MPY BSS 1     |                                 |
| C586**                                    |       |         |               |                                 |
| C587*** MULTIPLY UNPACKED NUMBER BY 10 ** |       |         |               |                                 |
| C588**                                    |       |         |               |                                 |
| C589                                      | 00777 | 000000  | MBY10 NOP     |                                 |
| C590                                      | 01000 | 063066R | LDA MANT1     | RETURN ON                       |
| C591                                      | 01001 | 002003  | SZA,RSS       | ZERO                            |
| C592                                      | 01002 | 125777R | JMP MBY10,I   | MANTISSA                        |
| C593                                      | 01003 | 065042R | LDB EXP       | MULTIPLY                        |
| C594                                      | 01004 | 044056  | ADB .5        | BY                              |
| C595                                      | 01005 | 075042R | STB EXP       | 8                               |
| C596                                      | 01006 | 067130R | LDB MANT2     | LOAD MANTISSA                   |
| C597                                      | 01007 | 000065  | CLE,ERA       | DIVIDE                          |
| C598                                      | 01010 | 005500  | ERB           | BY                              |
| C599                                      | 01011 | 000065  | CLE,ERA       | 4                               |
| C600                                      | 01012 | 005540  | ERB,CLE       |                                 |
| C601                                      | 01013 | 047130R | ADB MANT2     | DOUBLE                          |
| C602                                      | 01014 | 002040  | SEZ           | ADD TO                          |
| C603                                      | 01015 | 002004  | INA           | PRODUCE                         |
| C604                                      | 01016 | 043066R | ADA MANT1     | 1.25 * MANTISSA                 |
| C605                                      | 01017 | 002021  | SSA,RSS       | CORRECT                         |
| C606                                      | 01020 | 027025R | JMP *+5       |                                 |
| C607                                      | 01021 | 000065  | CLE,ERA       | ON                              |
| C608                                      | 01022 | 005500  | ERB           |                                 |
| C609                                      | 01023 | 035042R | ISZ EXP       | OVERFLOW                        |
| C610                                      | 01024 | 000000  | NOP           |                                 |
| C611                                      | 01025 | 073066R | STA MANT1     |                                 |
| C612                                      | 01026 | 077130R | STB MANT2     |                                 |
| C613                                      | 01027 | 125777R | JMP MBY10,I   |                                 |
| C614**                                    |       |         |               |                                 |
| C615*** DIVIDE UNPACKED NUMBER BY 10 **   |       |         |               |                                 |
| C616**                                    |       |         |               |                                 |
| C617                                      | 01030 | 000000  | DBY10 NOP     | MULTIPLY BY DOUBLE-LENGTH TENTH |
| C618                                      | 01031 | 063066R | LDA MANT1     | RETURN                          |

|      |       |         |             |                               |
|------|-------|---------|-------------|-------------------------------|
| 0619 | 01032 | 002005  | SZA,RSS     | ON ZERO                       |
| 0620 | 01033 | 127030R | JMP DBY10,I | MANTISSA                      |
| 0621 | 01034 | 064051  | LDB M2      | ADD EXPONENT OF               |
| 0622 | 01035 | 046042R | ADB EXP     | 'TENTH' TO                    |
| 0623 | 01036 | 076042R | STB EXP     | MANTISSA EXPONENT             |
| 0624 | 01037 | 063130R | LDA MANT2   | JUSTIFY                       |
| 0625 | 01040 | 000065  | CLE,ERA     | LOWER MANTISSA                |
| 0626 | 01041 | 100200  | MPY TENTH   | MULTIPLY BY 63146 (ONE-TENTH) |
|      | 01042 | 000217R |             |                               |
| 0627 | 01043 | 000065  | CLE,ELA     | SHIFT                         |
| 0628 | 01044 | 005640  | ELB,CLE     | BACK                          |
| 0629 | 01045 | 040001  | ADA 1       | ADD IN LOWER MANTISSA*        |
| 0630 | 01046 | 002040  | SEZ         | TENTH*(2)-16                  |
| 0631 | 01047 | 006004  | INB         | AND ROUND                     |
| 0632 | 01050 | 077130R | STB MANT2   | TO 16 BITS                    |
| 0633 | 01051 | 063066R | LDA MANT1   | DO                            |
| 0634 | 01052 | 100200  | MPY TENTH   | SAVE FOR                      |
|      | 01053 | 000217R |             |                               |
| 0635 | 01054 | 000040  | CLE         | HIGH                          |
| 0636 | 01055 | 040001  | ADA 1       | MANTISSA                      |
| 0637 | 01056 | 043130R | ADA MANT2   | (EFFECTIVELY) SUM             |
| 0638 | 01057 | 002040  | SEZ         | DOUBLE-LENGTH                 |
| 0639 | 01060 | 006004  | INB         | PRODUCTS                      |
| 0640 | 01061 | 077066R | STB MANT1   | EXCHANGE                      |
| 0641 | 01062 | 070001  | STA 1       | (A) AND (B)                   |
| 0642 | 01063 | 063066R | LDA MANT1   | REGISTERS                     |
| 0643 | 01064 | 016742R | JSB NORML   | NORMALIZE RESULT              |
| 0644 | 01065 | 127030R | JMP DBY10,I |                               |

## BASE PAGE SUBROUTINES

C646\*\*

C647\*\*\* FIND AND STORE ONE-CHARACTER OPERATORS \*\*

C648\*\*

|      |       |         |       |             |                           |
|------|-------|---------|-------|-------------|---------------------------|
| C649 | 01066 | 000000  | SYMCK | NOP         | CHARACTER IN (A)          |
| C650 | 01067 | 076053R |       | STB COUNT   | -(ENTRIES TO BE SEARCHED) |
| C651 | 01070 | 001727  |       | ALF,ALF     | POSITION                  |
| C652 | 01071 | 032141R |       | IOR .32     | CHARACTER                 |
| C653 | 01072 | 167066R |       | LDB SYMCK,I | STARTING TABLE ENTRY - 2  |
| C654 | 01073 | 037066R |       | ISZ SYMCK   | SET RETURN ADDRESS        |
| C655 | 01074 | 044055  | SYMC1 | ADB .2      | UPDATE TABLE POINTER      |
| C656 | 01075 | 150001  |       | CPA 1,1     | MATCH?                    |
| C657 | 01076 | 027104R |       | JNP SYMC2   |                           |
| C658 | 01077 | 036053R |       | ISZ COUNT   | NO, CONTINUE SEARCH?      |
| C659 | 01100 | 027074R |       | JMP SYMC1   | YES                       |
| C660 | 01101 | 001727  |       | ALF,ALF     | NO, RESTORE               |
| C661 | 01102 | 010073  |       | AND B177    | CHARACTER                 |
| C662 | 01103 | 127066R |       | JMP SYMCK,I | AND EXIT                  |
| C663 | 01104 | 003400  | SYMC2 | CCA         | GET                       |
| C664 | 01105 | 040001  |       | ADA 1       | INFORMATION               |
| C665 | 01106 | 160000  |       | LDA 0,1     | WORD                      |
| C666 | 01107 | 012220R |       | AND OPMSK   | AND                       |
| C667 | 01110 | 172022R |       | STA SBPTR,I | STORE IT                  |
| C668 | 01111 | 052204R |       | CPA B6000   | ::                        |
| C669 | 01112 | 027323R |       | JMP FSC14   |                           |
| C670 | 01113 | 037066R |       | ISZ SYMCK   | RETURN VIA                |
| C671 | 01114 | 127066R |       | JMP SYMCK,I | (P+2)                     |

C672\*\*

C673\*\*\* FIND CALLED SUBROUTINE \*\*

C674\*\*

|      |       |         |       |             |                                |
|------|-------|---------|-------|-------------|--------------------------------|
| C675 | 01115 | 000000  | FND5B | NOP         |                                |
| C676 | 01116 | 076050R |       | STB TEMP2   | SAVE SUBROUTINE NUMBER         |
| C677 | 01117 | 066124R |       | LDB BGNTB   | LOAD (B) WITH SUBROUTINE TABLE |
| C678 | 01120 | 056125R | FND51 | CPB ENDTB   | END OF TABLE?                  |
| C679 | 01121 | 016274R |       | JSB ERROR   | YES                            |
| C680 | 01122 | 160001  | CALER | LDA 1,1     | NO, EXTRACT                    |
| C681 | 01123 | 010072  |       | AND .65     | SUBROUTINE NUMBER              |
| C682 | 01124 | 052050R |       | CPA TEMP2   | DESIRED ONE?                   |
| C683 | 01125 | 127115R |       | JMP FND5B,I | YES                            |
| C684 | 01126 | 044055  |       | ADB .2      | NO, MOVE TO                    |
| C685 | 01127 | 027120R |       | JMP FND51   | NEXT TABLE ENTRY               |

C687\*

C688\*

C689\*

C690\*

C691\*

C692\*

C693\*

C694\*

C695\*

C696 01130 000000 MDIM NOP

\*\*\*\*\*

SUBROUTINE TO COMPUTE THE STORAGE REQUIRED BY AN  
ARRAY WHOSE PACKED DIMENSIONS ARE IN A UPON ENTRY

\*\*\*\*\*

THE SUBROUTINE RETURNS IN A THE NUMBER OF LOCATIONS  
REQUIRED FOR THE SPECIFIED DIMENSIONS

= 2\*DIM1\*DIM2

## BASE PAGE SUBROUTINES

|      |       |             |            |                                |
|------|-------|-------------|------------|--------------------------------|
| 0697 | 01131 | 070001      | STA 1      | STORE PACKED DIMS. TEMPORALILY |
| 0698 | 01132 | 010074      | AND MSK0   |                                |
| 0699 | 01133 | 073223R     | STA .FLUN  | STORE # OF COLUMNS             |
| 0700 | 01134 | 080001      | LDA 1      |                                |
| 0701 | 01135 | 001727      | ALF,ALF    |                                |
| 0702 | 01136 | 010074      | AND MSK0   | A = # OF ROWS                  |
| 0703 | 01137 | 001000      | ALS        | DOUBLE FOR FLOATING POINT      |
| 0704 | 01140 | 100200      | MPY .FLUN  | COMPUTE 2*ROW*COLUMN           |
|      | 01141 | 001223R     |            |                                |
| 0705 | 01142 | 002020      | SSA        | RESULT < 32768 ?               |
| 0706 | 01143 | 016274R     | JSB ERROR  | NO, ERROR DIMENSIONS TOO LARGE |
| 0707 | 01144 | 006002 MER9 | SZB        | RESULT < 64K?                  |
| 0708 | 01145 | 027143R     | JMP *-2    | NO, ERROR                      |
| 0709 | 01146 | 127130R     | JMP MDIM,1 | YES, RETURN                    |

## BASE PAGE SUBROUTINES

C711\*\*

C712\*\*\* ROUND A SUBSCRIPT TO AN INTEGER \*\*

C713\*\*

C714\*

C715\* RETURNS INTEGER IN [1,32767] (BIASED BY -1)

C716\* OR EXITS TO ERROR.

C717\*

|      |       |         |         |         |                          |
|------|-------|---------|---------|---------|--------------------------|
| C718 | 01147 | 000000  | SBFIX   | NOP     | SUBSCRIPT IN (A) AND (B) |
| C719 | 01150 | 017160R | JSB     | IFIX    | 24-BIT INTEGER?          |
| C720 | 01151 | 027221R | JMP     | E6-1    | NO                       |
| C721 | 01152 | 002041  | SEZ,RSS |         | YES, ROUND AND           |
| C722 | 01153 | 044052  | ADB M1  |         | BIAS BY -1               |
| C723 | 01154 | 002003  | SZA,RSS |         | 15-BIT                   |
| C724 | 01155 | 006020  | SSB     |         | POSITIVE INTEGER?        |
| C725 | 01156 | 027221R | JMP     | E6-1    | NO                       |
| C726 | 01157 | 127147R | JMP     | SBFIX,I | YES                      |

C727\*\*

C728\*\*\* INTEGERIZE FLOATING POINT NUMBER \*\*

C729\*\*

|      |       |         |         |             |                                 |
|------|-------|---------|---------|-------------|---------------------------------|
| C730 | 01160 | 000000  | IFIX    | NOP         |                                 |
| C731 | 01161 | 102101  | STO     |             |                                 |
| C732 | 01162 | 073377R | STA     | GETCR       | SAVE (A)                        |
| C733 | 01163 | 017223R | JSB     | .FLUN       | EXPONENT                        |
| C734 | 01164 | 002020  | SSA     |             | NON-NEGATIVE?                   |
| C735 | 01165 | 027210R | JMP     | IFIX3       | NO                              |
| C736 | 01166 | 042236R | ADA M16 |             | YES, EXPONENT                   |
| C737 | 01167 | 002020  | SSA     |             | <= 15?                          |
| C738 | 01170 | 103101  | CLD     |             | YES                             |
| C739 | 01171 | 040043  | ADA M8  |             | EXPONENT                        |
| C740 | 01172 | 002021  | SSA,RSS |             | <= 23?                          |
| C741 | 01173 | 127160R | JMP     | IFIX,I      | NO, ALL SIGNIFICANCE IS INTEGER |
| C742 | 01174 | 040043  | ADA M8  |             | MOVE BINARY POINT TO END OF (B) |
| C743 | 01175 | 073223R | STA     | .FLUN       | SAVE SHIFT COUNT                |
| C744 | 01176 | 063377R | LDA     | GETCR       | RETRIEVE (A)                    |
| C745 | 01177 | 027204R | JMP     | IFIX2       |                                 |
| C746 | 01200 | 000071  | IFIX1   | CLE,SLA,ARS | SHIFT (A) RIGHT                 |
| C747 | 01201 | 002200  | CME     |             | SHIFT (B)                       |
| C748 | 01202 | 004035  | SLB,ERB |             | RIGHT                           |
| C749 | 01203 | 102101  | STO     |             | NOTE IF A 1 IS LOST             |
| C750 | 01204 | 037223R | IFIX2   | ISZ .FLUN   | DONE?                           |
| C751 | 01205 | 027200R | JMP     | IFIX1       | NO                              |
| C752 | 01206 | 037160R | ISZ     | IFIX        | YES                             |
| C753 | 01207 | 127160R | JMP     | IFIX,I      |                                 |
| C754 | 01210 | 063377R | IFIX3   | LDA GETCR   | RETRIEVE (A)                    |
| C755 | 01211 | 002120  | CLE,SSA |             | TRUNCATE                        |
| C756 | 01212 | 003401  | CCA,RSS |             | TO                              |
| C757 | 01213 | 002401  | CLA,RSS |             | -1                              |
| C758 | 01214 | 007401  | CCB,RSS |             | OR                              |
| C759 | 01215 | 006400  | CLB     |             | 0                               |
| C760 | 01216 | 027206R | JMP     | IFIX2+2     |                                 |

```

C762**
C763*** TAKE ARITHMETIC INVERSE **
C764**
C765 01217 000000 ARINV NOP      NUMBER IN (A) AND (B)
C766 01220 015001X      FMP N1      MULTIPLY BY MINUS 1 TO TAKE INVERSE
      01221 000231R
C767 01222 127217R      JMP ARINV,I
C768**
C769*** UNPACK LOW WORD OF NUMBER **
C770**
C771 01223 000000 .FLUN NOP      WORD IN (B)
C001 01224 060001      LDA 1      (A) = (B)
C002 01225 010074      AND MSK0   EXTRACT EXPONENT IN (A)
C003 01226 007000      CMB        SUBTRACT OFF
C004 01227 044000      ADB 0      EXPONENT FROM
C005 01230 007000      CMB        MANTISSA IN (B)
C006 01231 000033      SLA,RAR    NEGATIVE EXPONENT?
C007 01232 032221R      IOR MSK4   YES, FILL IN LEADING BITS
C008 01233 127223R      JMP .FLUN,I NO
C009**
C010*** STACK (B) ON LOW-CORE STACK **
C011**
C012 01234 000000 SLWST NOP
C013 01235 035027R      ISZ LSTPT  ADVANCE 'LOW
C014 01236 062027R      LDA LSTPT  STACK' POINTER
C015 01237 052030R      CPA HSIPT  STACK OVERFLOW?
C016 01240 015274R E1    JSB ERROR  YES
C017 01241 175027R      STB LSTPT,I NO, STACK (B)
C018 01242 127234R      JMP SLWST,I

```



## BASE PAGE SUBROUTINES

```

C020**
C021*** BUMP HIGH STACK POINTER **
C022**
C023 01243 000000 BHSTP NOP
C024 01244 007400 CCB ADVANCE
C025 01245 045030R ADB HSTPT
C026 01246 075030R STB HSTPT POINTER
C027 01247 055027R CPB LSTPT OVERFLOW?
C028 01250 027240R JMP E1 YES
C029 01251 127243R JMP BHSTP,I NO
C030**
C031*** FETCH TOP OF STACK **
C032**
C033 01252 000000 STTOP NOP
C034 01253 017266R JSB UPCHK VALIDATE
C035 01254 017321R JSB RSCHK OPERAND
C036 01255 165030R LDB HSTPT,I SAVE
C037 01256 005020 SSB DATA ON DISK?
C038 01257 027263R JMP STT01 YES
C039 01260 104200 DLD 1,I LOAD NUMBER
      01261 100001
C040 01262 127252R JMP STTOP,I
C041 01263 060001 STT01 LDA B
C042 01264 017505R JSB FTHOP LOAD NUMBER
C043 01265 127252R JMP STTOP,I
C044**
C045*** VERIFY LEGITIMACY OF OPERAND **
C046**
C047 01266 000000 UPCHK NOP
C048 01267 165030R LDB HSTPT,I OPERAND ADDRESS TO (B)
C049 01270 005020 SSB DATA ON DISK?
C050 01271 017313R JSB GETOP YES, GET HIGH PART OF OPERAND
C051 01272 160001 LDA 1,I HIGH PART OF
C052 01273 052263R CPA MNEG OPERAND 100000B?
C053 01274 005005 INB,RSS YES
C054 01275 027304R JMP UPCH1 NO
C055 01276 005020 SSB DATA ON DISK?
C056 01277 017313R JSB GETOP YES, GET LOW PART OF OPERAND
C057 01300 160001 LDA 1,I LOW PART
C058 01301 052264R CPA MNEG+1 776B?
C059 01302 015274R .E8 JSB ERROR YES
C060 01303 044052 E8 ADB M1
C061 01304 055026R OPCH1 CPB TSTPT TEMPORARY OPERAND?
C062 01305 002001 RSS YES
C063 01306 127266R JMP UPCHK,I NO
C064 01307 062026R LDA TSTPT UNSTACK
C065 01310 040051 ADA M2 THE TEMPORARY
C066 01311 072026R STA TSTPT OPERAND
C067 01312 127266R JMP UPCHK,I EXIT WITH ADDRESS IN (B)
C068 01313 000000 GETOP NOP
C069 01314 060001 LDA B
C070 01315 012222R AND INF
C071 01316 017204R JSB DREAD
C072 01317 037313R ISZ GETOP
C073 01320 127313R JMP GETOP,I

```

## BASE PAGE SUBROUTINES

C074\*\*

C075\*\*\* ALLOT SPACE FOR INTERMEDIATE RESULT \*\*

C076\*\*

|      |       |         |         |         |                  |
|------|-------|---------|---------|---------|------------------|
| C077 | 01321 | 000000  | RSCHK   | NOP     |                  |
| C078 | 01322 | 062026R | LDA     | TSTPT   | ALLOT            |
| C079 | 01323 | 040055  | ADA     | .2      |                  |
| C080 | 01324 | 072026R | STA     | TSTPT   | SPACE            |
| C081 | 01325 | 040052  | ADA     | M1      | OVERFLOW INTO    |
| C082 | 01326 | 052012R | CPA     | LSTAK   | LOW-CORE STACK?  |
| C083 | 01327 | 002001  | RSS     |         | YES              |
| C084 | 01330 | 127321R | JMP     | RSCHK,I | NO               |
| C085 | 01331 | 062012R | LDA     | LSTAK   | SAVE             |
| C086 | 01332 | 002004  | INA     |         | LOWER            |
| C087 | 01333 | 072051R | STA     | TEMP3   | STACK BOUND      |
| C088 | 01334 | 040064  | ADA     | .9      | UPDATE           |
| C089 | 01335 | 072012R | STA     | LSTAK   | STACK BOTTOM     |
| C090 | 01336 | 062027R | LDA     | LSTPT   | SET              |
| C091 | 01337 | 002004  | INA     |         | SOURCE           |
| C092 | 01340 | 072050R | STA     | TEMP2   | ADDRESS          |
| C093 | 01341 | 040064  | ADA     | .9      | UPDATE           |
| C094 | 01342 | 072027R | STA     | LSTPT   | STACK TOP        |
| C095 | 01343 | 002004  | INA     |         | SET .DESTINATION |
| C096 | 01344 | 072052R | STA     | TEMP4   | ADDRESS          |
| C097 | 01345 | 003004  | CMA,INA |         | OVERFLOW         |
| C098 | 01346 | 042030R | ADA     | HSTPT   | INTO             |
| C099 | 01347 | 002020  | SSA     |         | HIGH-CORE STACK? |
| C100 | 01350 | 027240R | JMP     | E1      | YES              |
| C101 | 01351 | 015367R | JSB     | MVTOC   | NO, MOVE         |
| C102 | 01352 | 127321R | JMP     | RSCHK,I | LOW-CORE STACK   |

C103\*\*

C104\*\*\* CHECK FOR DIGIT \*\*

C105\*\*

|      |       |         |         |         |                            |
|------|-------|---------|---------|---------|----------------------------|
| C106 | 01353 | 000000  | DIGCK   | NOP     | CHARACTER IN (A)           |
| C107 | 01354 | 064000  | LDB     | 0       |                            |
| C108 | 01355 | 046246R | ADB     | D72     | ASCII 72B                  |
| C109 | 01356 | 005021  | SSB,RSS |         | OR GREATER?                |
| C110 | 01357 | 127353R | JMP     | DIGCK,I | YES, RETURN WITH CHARACTER |
| C111 | 01360 | 044065  | ADB     | .10     | NO, ASCII 60B              |
| C112 | 01361 | 005020  | SSB     |         | OR GREATER?                |
| C113 | 01362 | 127353R | JMP     | DIGCK,I | NO                         |
| C114 | 01363 | 037353R | ISZ     | DIGCK   | YES, SET 'SUCCESS' EXIT,   |
| C115 | 01364 | 060001  | LDA     | 1       | LOAD DIGIT INTO (A),       |
| C116 | 01365 | 127353R | JMP     | DIGCK,I | AND RETURN                 |

C117\*\*

C118\*\*\* CHECK FOR LETTER \*\*

C119\*\*

|      |       |         |         |         |                                 |
|------|-------|---------|---------|---------|---------------------------------|
| C120 | 01366 | 000000  | LETCK   | NOP     | CHARACTER IN (A)                |
| C121 | 01367 | 064000  | LDB     | 0       |                                 |
| C122 | 01370 | 046252R | ADB     | D133    | ASCII 133B                      |
| C123 | 01371 | 005021  | SSB,RSS |         | OR GREATER?                     |
| C124 | 01372 | 127366R | JMP     | LETCK,I | YES, EXIT WITH CHARACTER IN (A) |
| C125 | 01373 | 046135R | ADB     | .26     | NO, ASCII 101B                  |
| C126 | 01374 | 005021  | SSB,RSS |         | OR GREATER?                     |
| C127 | 01375 | 037366R | ISZ     | LETCK   | YES                             |
| C128 | 01376 | 127366R | JMP     | LETCK,I | NO                              |

```

C129*
C130*  ON END-OF-FILE CONDITION RETURN TO P+1 ELSE
C131*  RETURN TO P+2 WITH NON-BLANK CHARACTER IN (A)
C132*
C133  01377 000000  GETCR NOP
C134  01400 035020R  ISZ CCNT      ANY CHARACTERS LEFT?
C135  01401 002001  RSS
C136  01402 127377R  JMP GETCR,I  NO, END-OF-FILE EXIT
C137  01403 065017R  LDB BADDR  LOAD BUFFER ADDRESS
C138  01404 035017R  ISZ BADDR  UPDATE FOR NEXT TIME
C139  01405 004065  CLE,ERB   SET CHARACTER FLAG
C140  01406 160001  LDA 1,1   LOAD CURRENT BUFFER WORD
C141  01407 002041  SEZ,RSS   FIRST CHARACTER?
C142  01410 001727  ALF,ALF   YES, POSITION IT
C143  01411 010073  AND B177  MASK EXTRANEIOUS BITS
C144  01412 052271R  CPA BLANK  BLANK?
C145  01413 027400R  JMP GETCR+1 YES, FETCH NEXT CHARACTER
C146  01414 037377R  ISZ GETCR  UPDATE RETURN ADDRESS
C147  01415 127377R  JMP GETCR,I  AND EXIT
C148**
C149***  BACKSPACE OVER ONE CHARACTER **
C150**
C151  01416 000000  BCKSP NOP
C152  01417 003400  CCA          BACKSPACE
C153  01420 042020R  ADA CCNT      OVER
C154  01421 072020R  STA CCNT      LAST
C155  01422 003400  CCA          CHARACTER IN
C156  01423 042017R  ADA BADDR      INPUT
C157  01424 072017R  STA BADDR      BUFFER
C158  01425 127416R  JMP BCKSP,I
C159**
C160***  PRINT A NUMBER **
C161**
C162  01426 000000  ENOUT NOP
C163  01427 002300  CCE          SET SIGN FLAG TRUE
C164  01430 016041R  JSB NUMOT     OUTPUT THE NUMBER
C165  01431 062141R  LDA .32      OUTPUT
C166  01432 017477R  JSB OUTCR     A BLANK
C167  01433 065060R  LDB MLBX1+1  FIELD
C168  01434 045020R  ADB CCNT
C169  01435 005002  SZB          FULL?
C170  01436 027431R  JMP *-5      NO
C171  01437 127426R  JMP ENOUT,1
C172**
C173***  SPACE FOR A COMMA **
C174**
C175  01440 000000  EDELM NOP
C176  01441 065020R  LDB CCNT      NO, LOAD CHARACTER COUNT
C177  01442 005003  EDEL1 SZB,RSS  ZERO?
C178  01443 127440R  JMP EDELM,1  YES
C179  01444 046235R  ADB M15      NO, SUBTRACT ZONE WIDTH
C180  01445 005021  SSB,RSS     NEGATIVE RESULT?
C181  01446 027442R  JMP EDEL1   NO
C182  01447 077461R  STB OUTLN   YES, SAVE BLANK COUNT
C183  01450 062141R  LDA .32      FETCH BLANK

```

## BASE PAGE SUBROUTINES

|      |       |         |             |        |
|------|-------|---------|-------------|--------|
| C184 | 01451 | 017477R | JSB OUTCR   | OUTPUT |
| C185 | 01452 | 037461R | ISZ OUTLN   |        |
| C186 | 01453 | 027450R | JMP *-3     | BLANKS |
| C187 | 01454 | 065020R | LDB CCNT    | LINE   |
| C188 | 01455 | 046251R | ADB M76     |        |
| C189 | 01456 | 005021  | SSB,RSS     | FULL?  |
| C190 | 01457 | 017461R | JSB OUTLN   | YES    |
| C191 | 01460 | 127440R | JMP EDELM,1 |        |

## BASE PAGE SUBROUTINES

C193\*\*

C194\*\*\* OUTPUT A COMPLETED LINE \*\*

C195\*\*

|      |       |         |             |                                    |
|------|-------|---------|-------------|------------------------------------|
| C196 | 01461 | 000000  | OUTLN NOP   |                                    |
| C197 | 01462 | 062034R | LDA TYPE    | FETCH 'CHARACTERS PRINTED' COUNTER |
| C198 | 01463 | 000010  | SLA         | CORRECT FOR START ON               |
| C199 | 01464 | 002004  | INA         | ODD PRINT POSITION                 |
| C200 | 01465 | 042020R | ADA CCNT    | OUTPUT                             |
| C201 | 01466 | 065016R | LDB .BUFA   | A                                  |
| C202 | 01467 | 017161R | JSB EXECW   | LINE                               |
| C203 | 01470 | 065060R | LDB MLBX1+1 | CORRECT                            |
| C204 | 01471 | 045020R | ADB CCNT    |                                    |
| C205 | 01472 | 075060R | STB MLBX1+1 | MARKER                             |
| C206 | 01473 | 002400  | CLA         | RESET COUNT OF                     |
| C207 | 01474 | 072034R | STA TYPE    | CHARACTERS PRINTED                 |
| C208 | 01475 | 016671R | JSB PRNIN   | CLEAN UP                           |
| C209 | 01476 | 127461R | JMP OUTLN,1 |                                    |

C210\*\*

C211\*\*\* ADD A CHARACTER TO OUTPUT BUFFER \*\*

C212\*\*

|      |       |         |             |                         |
|------|-------|---------|-------------|-------------------------|
| C213 | 01477 | 000000  | OUTCR NOP   | CHARACTER IN (A)        |
| C214 | 01500 | 073160R | STA IFIX    | SAVE CHARACTER          |
| C215 | 01501 | 035020R | ISZ CCNT    | COUNT IT                |
| C216 | 01502 | 065020R | LDB CCNT    | FIRST CHARACTER         |
| C217 | 01503 | 004010  | SLB         | OF BUFFER WORD?         |
| C218 | 01504 | 035017R | ISZ BADDR   | YES, MOVE TO FRESH WORD |
| C219 | 01505 | 162017R | LDA BADDR,I | LOAD BUFFER WORD        |
| C220 | 01506 | 004010  | SLB         | SAVE                    |
| C221 | 01507 | 001727  | ALF,ALF     | OTHER                   |
| C222 | 01510 | 010075  | AND M256    | CHARACTER               |
| C223 | 01511 | 033160R | IOR IFIX    | ADD NEW CHARACTER       |
| C224 | 01512 | 004010  | SLB         | POSITION                |
| C225 | 01513 | 001727  | ALF,ALF     | WORD AND                |
| C226 | 01514 | 172017R | STA BADDR,1 | STORE IT                |
| C227 | 01515 | 127477R | JMP OUTCR,I |                         |

C228\*

C229\*

|      |       |                   |
|------|-------|-------------------|
| C230 | 00046 | TEMP EQU TEMPS+1  |
| C231 | 00047 | TEMP1 EQU TEMPS+2 |
| C232 | 00050 | TEMP2 EQU TEMPS+3 |
| C233 | 00051 | TEMP3 EQU TEMPS+4 |
| C234 | 00052 | TEMP4 EQU TEMPS+5 |
| C235 | 00053 | COUNT EQU TEMPS+6 |
| C236 | 00051 | STEMP EQU TEMPS+4 |
| C237 | 01066 | MANT1 EQU SYMCK   |
| C238 | 01130 | MANT2 EQU MDIM    |
| C239 | 01366 | EXPON EQU LETCK   |
| C240 | 01416 | DPFLG EQU BCKSP   |
| C241 | 01477 | ARYAD EQU OUTCR   |
| C242 | 00402 | EOL EQU CONST     |

## BASIC INTERPRETER CONTROL

C244\*

C245\*\*\*\*\* BASIC INTERPRETER CONTROL \*\*\*\*\*

C246\*

C247\* THIS PROGRAM INTERPRETS THE SYSTEM COMMANDS AND PROVIDES

C248\* I/O CONTROL FOR THE BASIC INTERPRETER. ALL USER

C249\* COMMUNICATION IS DONE THRU THIS PROGRAM. USER RESPONSES ARE

C250\* CHECKED FOR SYSTEM COMMANDS AND IF A VALID COMMAND IS

C251\* DETECTED THIS PROGRAM INITIATES APPROPRIATE ACTION.

C252\*

C253\*

C254\* DATA LOCAL TO MONITOR

C255\*

C256 01516 001517R RDYA DEF READY

C257 01517 005412 READY OCT 5412

C258 01520 051105 ASC 2,READ

01521 040504

C259 01522 054415 OCT 54415

C260 01523 000216R LFEED DEF LF

C261 01524 000260R QMRKA DEF QMARK

C262 01525 004006R STOPA DEF STCMD

C263 01526 001715R CMNDA DEF CMNDS

C264 01527 000000 LTRAK BSS 1

C265 01530 000021 RC17 DEC 17

C266 01531 000000 ENTRY NOP

C267 01532 060147 LDA 147B

(LWA OF THIS PROG)

C268 01533 002004 INA

FIND START OF FREE CORE

C269 01534 072004C STA BGNPG

AND SAVE

C270 01535 072005C STA PG1

AS START OF BUFFER #1

C271 01536 003004 CMA,INA

C272 01537 040100 ADA 100B

(LWAM)

C273 01540 001100 ARS

FREE CORE / 2

C274 01541 005400 CLB

C275 01542 100400 DIV .128

DETERMINE # AVAIL SECTORS

01543 000172R

C276 01544 002003 SZA,RSS

ZERO SECTORS AVAIL ?

C277 01545 015274R JSB ERROR

YES, ERROR

C278 01546 100200 NOCOR MPY .128

DETERMINE BUFFER LENGTH

01547 000172R

FG 000

LN 0279 STA BFRL AND SAVE

C279 01550 072000 STA BFRL AND SAVE

C280 01551 042005C ADA PG1 DETERMINE START ADR OF BUFFER #2

C281 01552 072006C STA PG2 AND SAVE

C282 01553 015005X JSB EXEC

WORK AREA LIMITS

C283 01554 001561R DEF \*+5

C284 01555 001530R DEF RC17

C285 01556 000011C DEF FTRAK

C286 01557 001527R DEF LTRAK

C287 01560 015135R DEF SIZE

C288 01561 002400 CLA

C289 01562 072001C STA PGPT1

C290 01563 072002C STA PGPT2

C291 01564 072000C STA PGPTR

C292\*

## BASIC INTERPRETER CONTROL

|      |       |         |       |     |         |                                |
|------|-------|---------|-------|-----|---------|--------------------------------|
| 0293 | 01565 | 062002R | FLUSH | LDA | FWAM    |                                |
| 0294 | 01566 | 072007C |       | STA | PBUFF   | SET PROGRAM BUFFER ADDRESS     |
| 0295 | 01567 | 072010C |       | STA | PBPTR   | SET PROGRAM BUFFER POINTER     |
| 0296 | 01570 | 062141R |       | LDA | .32     | INITIALIZE                     |
| 0297 | 01571 | 072271R |       | STA | BLANK   | DELETE CHARACTER FOR GETCR     |
| 0298 | 01572 | 002400  |       | CLA |         | SET LINE NUMBER                |
| 0299 | 01573 | 072033R |       | STA | .LNUM   | TO 0 INITIALLY                 |
| 0300 | 01574 | 072015R |       | STA | OLDLN   |                                |
| 0301 | 01575 | 063741R | RDYPT | LDA | PRNTL   | SET TO                         |
| 0302 | 01576 | 073131R |       | STA | LISTR   | COMMAND MODE                   |
| 0303 | 01577 | 002400  |       | CLA |         |                                |
| 0304 | 01600 | 073667R |       | STA | DRQST   | CLEAR DATA REQUEST FLAG        |
| 0305 | 01601 | 072023R |       | STA | TFLAG   | CLEAR PHOTO READER INPUT FLAG  |
| 0306 | 01602 | 072024R |       | STA | TTYFL   | CLEAR TTY TAPE FLAG            |
| 0307 | 01603 | 072150R |       | STA | .DFLG   | CLEAR DISK INPUT FLAG          |
| 0308 | 01604 | 072025R |       | STA | ENFLG   |                                |
| 0309 | 01605 | 073264R |       | STA | XII     | RESET EXECUTION EXIT FLAG      |
| 0310 | 01606 | 060063  |       | LDA | .8      |                                |
| 0311 | 01607 | 067516R |       | LDB | RDYA    |                                |
| 0312 | 01610 | 017161R |       | JSB | EXECW   |                                |
| 0313 | 01611 | 063741R | PEXMK | LDA | PRNTL   | SHIFT TO                       |
| 0314 | 01612 | 073131R |       | STA | LISTR   | COMMAND MODE                   |
| 0315 | 01613 | 062023R |       | LDA | TFLAG   |                                |
| 0316 | 01614 | 002002  |       | SZA |         | IS TAPE FLAG SET?              |
| 0317 | 01615 | 027744R |       | JMP | PTAPE+1 | YES, GET RECORD FROM PHOTO RDR |
| 0318 | 01616 | 062150R |       | LDA | .DFLG   | IS DISK FLAG SET?              |
| 0319 | 01617 | 002002  |       | SZA |         |                                |
| 0320 | 01620 | 026052R |       | JMP | NXTRC   | GET RECORD FROM DISK           |
| 0321 | 01621 | 027633R |       | JMP | GTICD   | THIS ADDED (6-APR=71)          |

## BASIC INTERPRETER CONTROL

```

C323 01622 067523R DATAI LDB LFEEED      LOAD ADDRESS OF LINE FEED
C324 01623 075040R      STB RSYM      STORE ADDRESS OF READY SYMBOL
C325 01624 062024R      LDA TTYFL      TTY TAPE
C326 01625 002002      SZA      INPUT?
C327 01626 027636R      JMP GTRCD+3      YES, SUPPRESS LINE FEED
C328 01627 003400      CCA      NO
C329 01630 065040R      LDB RSYM      LOAD LF OR '?' ADDRESS
C330 01631 017161R      JSB EXECW      PRINT LF OR '?', NO CR-LF
C331 01632 027636R      JMP *+4
C332 01633 060050      GTRCD LDA M3      PRINT ! TO SAY BASIC
C333 01634 067712R      LDB XPNT      IS READY
C334 01635 017161R      JSB EXECW
C335 01636 062247R      LDA M72
C336 01637 065016R      LDB .BUFA
C337 01640 017124R      JSB EXECR      GET RECORD FROM TTY
C338*
C339 01641 003021      RPRCS CMA,SSA,RSS      SET A=-1-# CHARS AND CHECK FOR
C340 01642 015274R      JSB ERROR      RECORD TOO LONG
C341 01643 072020R      RTLE STA CCNT      -1-# CHARACTERS < 0, SET CCNT
C342 01644 062016R      LDA .BUFA      LOAD BUFFER ADDRESS
C343 01645 000066      CLE,ELA      SHIFT LEFT, LEAST BIT USED AS
C344 01646 072017R      STA BADDR      ODD/EVEN FLAG
C345 01647 017377R      JSB GETCR      FETCH FIRST CHARACTER
C346 01650 027622R      JMP DATAI      NULL RECORD, INPUT AGAIN
C347 01651 067667R      LDB DRQST
C348 01652 005003      SZB,RSS      DATA REQUEST?
C349 01653 027674R      JMP CKRCD      NO DATA REQUEST, GO CHECK RECORD
C350 01654 052167R      CPA S      ASCII S FIRST CHARACTER?
C351 01655 027760R      JMP STOP      ASSUME STOP REQUESTED
C352 01656 002400      CLA      LINE
C353 01657 017161R      JSB EXECW      FEED
C354 01660 017416R      JSB BCKSP      BACKSPACE
C355 01661 062226R      LDA RMODE      RETURN TO
C356 01662 073131R      STA LISTR      RUN MODE
C357 01663 067667R      LDB DRQST
C358 01664 002400      CLA
C359 01665 073667R      STA DRQST      CLEAR DATA REQUEST FLAG
C360 01666 124001      JMP 1,I      GO TO DATA REQUEST CALLING POINT
C361*
C362*
C363* THIS SECTION REQUESTS DATA INPUT
C364*
C365 01667 000900      DRQST NOP      EXIT/ENTRY AND FLAG
C366 01670 067741R      LDB PRNTL      SHIFT TO
C367 01671 077131R      STB LISTR      COMMAND MODE
C368 01672 067524R      LDB QMRKA
C369 01673 027623R      JMP DATAI+1      PRINT '?' AND WAIT

```



```

C371*
C372*  THIS SECTION CHECKS RECORD FOR SYSTEM COMMANDS.
C373*
C374  01674 066021R CKRCD LDB SBUFA
C375  01675 076022R      STB SBPTR      INITIALIZE SYNTAX BUFFER POINTER
C376  01676 172022R      STA SBPTR,I    PUT FIRST CHAR IN SYNTAX BUFFER
C377  01677 017366R      JSB LETCK      IS CHARACTER A LETTER
C378  01700 025155R      JMP SYNTAX     NO, TRY SYNTAX
C379*
C380  01701 062105R      LDA TBLAD      LOAD SYS CMND TABLE START POINT
C381  01702 064041      LDB M10        LOOK FOR A
C382  01703 015242R      JSB IBSRH      SYSTEM COMMAND
C383  01704 015274R      JSB ERROR      NOT A VALID COMMAND
C384*
C385  01705      INVSC EQU *          INVALID CMND ERROR REFERENCE
C386  01705 060065      LDA .10
C387  01706 042053R      ADA COUNT
C388  01707 043526R      ADA CMNDA      ADD START ADDR. OF CMND ROUTINES
C389  01710 164000      LDB 0,I
C390  01711 124001      JMP 1,I
C391*
C392  01712 001713R XPNT DEF *+1
C393  01713 020440      ASC 2,! _
      01714 057440

```

## BASIC INTERPRETER CONTROL

```

C395*
C396* THIS SETS UP AND EXECUTES THE SYSTEM COMMANDS
C397*
C398 01715 CMNDS EQU * COMMAND LIST REFERENCE
C399*
C400*****
C401*** THE FOLLOWING TABLE ADDED 13-APR-71 ***
C402*****
C403*
C404 01715 001727R DEF RUN
C405 01716 001730R DEF SCRTH
C406 01717 001731R DEF TLIST
C407 01720 001733R DEF PLIST
C408 01721 001743R DEF PTAPE
C409 01722 001760R DEF STOP
C410 01723 001772R DEF TAPE
C411 01724 001774R DEF BYEC
C412 01725 001777R DEF PUNC
C413 01726 002003R DEF LOAD
C414*
C415*****
C416 01727 027256R RUN JMP MFASE GO TO RUN ENTRY POINT
C417*
C418 01730 027565R SCRTH JMP FLUSH SCRATCH CURRENT PROGRAM
C419 01731 063741R TLIST LDA PRNTL LIST PROGRAM, TFLAG = 0
C420 01732 005401 CLB,RSS
C421 01733 063740R PLIST LDA PUNCL PUNCH PROGRAM TFLAG # 0
C422 01734 073131R STA LISTR SET DRIVER ADDRESS
C423 01735 005400 CLB
C424 01736 076023R LPUNF STB TFLAG
C425 01737 025641R JMP LIST GO TO LIST ENTRY POINT
C426 01740 013242R PUNCL DEF EXECPT
C427 01741 013161R PRNTL DEF EXECW
C428 01742 013211R TLPUN DEF LPUN
C429 01743 000000 PTAPE NOP
C430 01744 062025R LDA ENFLG
C431 01745 002003 SZA,RSS
C432 01746 027751R JMP *+3
C433 01747 017152R JSB EXECS
C434 01750 027575R JMP RDYPT
C435 01751 062163R LDA .72
C436 01752 065016R LDB .BUFA
C437 01753 017137R JSB EXECT GET RECORD FROM PHOTO READER
C438 01754 002003 PRERR SZA,RSS YES
C439 01755 027744R JMP PTAPE+1 NULL RECORD
C440 01756 072023R STA TFLAG SET FLAG # 0
C441 01757 027641R JMP RPRCS GO PROCESS RECORD
C442*
C443* STOP COMMAND SERVICE
C444*
C445 01760 067741R STOP LDB PRNTL SHIFT TO
C446 01761 077131R SIB LISTR COMMAND MODE
C447 01762 062263R LDA MNeg
C448 01763 002006 INA,SZA
C449 01764 027763R JMP *-1 DELAY FOR 100 MILLISECONDS

```

|         |       |                             |                 |                                 |
|---------|-------|-----------------------------|-----------------|---------------------------------|
| C450    | 01765 | 017161R                     | JSB EXECW       | C-R AND L-F                     |
| C451    | 01766 | 060057                      | LDA .4          |                                 |
| C452    | 01767 | 067525R                     | LDB STOPA       |                                 |
| C453    | 01770 | 017161R                     | JSB EXECW       | PRINT 'STOP'                    |
| C454    | 01771 | 027575R                     | JMP RDIPT       |                                 |
| C455*   |       |                             |                 |                                 |
| C456**  | SET   | LINE FEED SUPPRESSION       |                 |                                 |
| C457*   |       |                             |                 |                                 |
| C458    | 01772 | 072024R                     | TAPE STA TTYFL  | SET TO 'TAPE' MODE              |
| C459    | 01773 | 027633R                     | JMP GTRCD       |                                 |
| C460    | 01774 | 015005X                     | BYEC JSB EXEC   |                                 |
| C461    | 01775 | 001777R                     | DEF *+2         |                                 |
| C462    | 01776 | 000061                      | DEF .6          |                                 |
| C463    | 01777 | 063742R                     | PUNC LDA TLPUN  |                                 |
| C464    | 02000 | 073131R                     | STA LISTR       |                                 |
| C465    | 02001 | 005404                      | CLB,INB         |                                 |
| C466    | 02002 | 027736R                     | JMP LPUNF       |                                 |
| C467**  |       |                             |                 |                                 |
| C468*** |       | LOAD PROGRAM FROM DISK FILE |                 |                                 |
| C469**  |       |                             |                 |                                 |
| C470    | 02003 | 000000                      | LOAD NOP        |                                 |
| C471    | 02004 | 062152R                     | LDA SPSP        | SET FILE NAME                   |
| C472    | 02005 | 072137R                     | STA FNAME       | TO                              |
| C473    | 02006 | 072140R                     | STA FNAME+1     | ALL                             |
| C474    | 02007 | 072141R                     | STA FNAME+2     | BLANKS                          |
| C475    | 02010 | 062136R                     | LDA FADR        | LOAD FILE NAME ADDRESS          |
| C476    | 02011 | 001000                      | ALS             | DOUBLE TO USE AS BYTE POINTER   |
| C477    | 02012 | 073160R                     | STA PNTR        |                                 |
| C478    | 02013 | 017377R                     | LD1 JSB GETCR   | FETCH FILE NAME CHARACTER       |
| C479    | 02014 | 025032R                     | JMP LD2         | END OF INPUT FILE, EXIT         |
| C480    | 02015 | 072045R                     | STA .TEMP       | SAVE CHARACTER                  |
| C481    | 02016 | 067160R                     | LDB PNTR        | GET BYTE POINTER                |
| C482    | 02017 | 037160R                     | ISZ PNTR        | BUMP POINTER                    |
| C483    | 02020 | 004065                      | CLE,ERB         | MAKE WORD ADDRESS AND SET       |
| C484    | 02021 | 160001                      | LDA B,I         | L/R FLAG THEN GET WORD          |
| C485    | 02022 | 002041                      | SEZ,RSS         | (E)=0 FOR LEFT CHAR.            |
| C486    | 02023 | 001727                      | ALF,ALF         | POSITION CHARACTER TO LEFT BYTE |
| C487    | 02024 | 010075                      | AND M256        | MASK RIGHT BYTE AND ADD         |
| C488    | 02025 | 032045R                     | IOR .TEMP       | NEW CHARACTER                   |
| C489    | 02026 | 002041                      | SEZ,RSS         | (E)=0 SWAP HALVES               |
| C490    | 02027 | 001727                      | ALF,ALF         | OF A                            |
| C491    | 02030 | 170001                      | STA B,I         | AND SAVE                        |
| C492    | 02031 | 025013R                     | JMP LD1         | DO IT AGAIN                     |
| C493    | 02032 | 015005X                     | LD2 JSB EXEC    | SEARCH DISK FOR REQUESTED       |
| C494    | 02033 | 002037R                     | DEF *+4         | FILE                            |
| C495    | 02034 | 000131R                     | DEF .18         |                                 |
| C496    | 02035 | 002137R                     | DEF FNAME       |                                 |
| C497    | 02036 | 002142R                     | DEF NSECT       |                                 |
| C498    | 02037 | 062142R                     | LDA NSECT       | IF FILE NOT FOUND               |
| C499    | 02040 | 002003                      | SZA,RSS         | PRINT ERROR MESSAGE             |
| C500    | 02041 | 016274R                     | JSB ERKOR       |                                 |
| C501    | 02042 | 062142R                     | NOFIL LDA NSECT |                                 |
| C502    | 02043 | 002004                      | INA             |                                 |
| C503    | 02044 | 003004                      | CMA,INA         | MAKE -(SECTORS+1)               |
| C504    | 02045 | 072145R                     | STA ENTLN       |                                 |

## BASIC INTERPRETER CONTROL

|         |       |         |                                                     |                                   |
|---------|-------|---------|-----------------------------------------------------|-----------------------------------|
| C505    | 02046 | 062146R | LDA DNBUF                                           | FORCE READ OF FIRST SECTOR        |
| C506    | 02047 | 072144R | STA MLOCN                                           |                                   |
| C507    | 02050 | 002400  | CLA                                                 | SET RELATIVE SECTOR               |
| C508    | 02051 | 072143R | STA RLSEC                                           | TO ZERO                           |
| C509    | 02052 | 062025R | NXTRC LDA ENFLG                                     | END STATEMENT ENCOUNTERED?        |
| C510    | 02053 | 002002  | SZA                                                 |                                   |
| C511    | 02054 | 027575R | JMP RDYPT                                           | YES, RETURN TO READY              |
| C512    | 02055 | 015061R | JSB DISCR                                           | NO, READ NEXT SOURCE STATEMENT    |
| C513    | 02056 | 027575R | JMP RDYPT                                           | END OF FILE, RETURN TO READY      |
| C514    | 02057 | 072150R | STA .DPLG                                           | SET DISK INPUT FLAG               |
| C515    | 02060 | 027641R | JMP RPRCS                                           | GO PROCESS RECORD                 |
| C516**  |       |         |                                                     |                                   |
| C517**  |       |         |                                                     |                                   |
| C518*** |       |         | READ A SOURCE STATEMENT FROM THE DISC OUTPUT BUFFER |                                   |
| C519*** |       |         | WHEN THE BUFFER IS EXHAUSTED ANOTHER SECTOR IS READ |                                   |
| C520*** |       |         | FROM THE DISK.                                      |                                   |
| C521**  |       |         |                                                     |                                   |
| C522**  |       |         |                                                     |                                   |
| C523    | 02061 | 000000  | DISCR NOP                                           |                                   |
| C524    | 02062 | 016105R | JSB DRORD                                           | GO GET THE 1ST WORD(= # OF WORDS) |
| C525    | 02063 | 001727  | ALF, ALF                                            |                                   |
| C526    | 02064 | 010072  | AND B77                                             |                                   |
| C527    | 02065 | 072153R | STA STLEN                                           | SAVE STATEMENT LENGTH             |
| C528    | 02066 | 002003  | SZA, RSS                                            | IS IT=0                           |
| C529    | 02067 | 125061R | JMP DISCR, I                                        | YES, END OF FILE EXIT             |
| C530    | 02070 | 003004  | CMA, INA                                            |                                   |
| C531    | 02071 | 072154R | STA TERMS                                           | SET WORD COUNTER                  |
| C532    | 02072 | 062016R | LDA .BUFA                                           | SET START                         |
| C533    | 02073 | 072151R | STA SBUFF                                           | OF 'BUFFER'                       |
| C534    | 02074 | 016105R | DSCR2 JSB DRORD                                     |                                   |
| C535    | 02075 | 172151R | STA SBUFF, I                                        |                                   |
| C536    | 02076 | 035151R | ISZ SBUFF                                           |                                   |
| C537    | 02077 | 035154R | ISZ TERMS                                           | HAVE WE FINISHED THE STATEMENT?   |
| C538    | 02100 | 025074R | JMP DSCR2                                           | NO                                |
| C539    | 02101 | 035061R | ISZ DISCR                                           | YES- RETURN                       |
| C540    | 02102 | 062153R | LDA SILEN                                           | GET STATEMENT LENGTH              |
| C541    | 02103 | 001000  | ALS                                                 | MAKE CHARACTERS                   |
| C542    | 02104 | 125061R | JMP DISCR, I                                        |                                   |
| C543**  |       |         |                                                     |                                   |
| C544*** |       |         | READ A WORD FROM DISK INPUT BUFFER                  |                                   |
| C545*** |       |         | WHEN THE BUFFER IS EXHAUSTED A NEW SECTOR           |                                   |
| C546*** |       |         | IS READ FROM THE DISK                               |                                   |
| C547**  |       |         |                                                     |                                   |
| C548    | 02105 | 000000  | DRORD NOP                                           |                                   |
| C549    | 02106 | 062144R | LDA MLOCN                                           |                                   |
| C550    | 02107 | 052146R | CPA DNBUF                                           | POINTER AT END OF BUFFER          |
| C551    | 02110 | 002001  | RSS                                                 | YES                               |
| C552    | 02111 | 025120R | JMP DWDS                                            | NO- GET THE NEXT WORD             |
| C553    | 02112 | 062147R | LDA DBUFF                                           |                                   |
| C554    | 02113 | 072144R | STA MLOCN                                           | SET POINTER TO START OF BUFFER    |
| C555    | 02114 | 035145R | ISZ ENTLN                                           | ARE WE AT THE END?                |
| C556    | 02115 | 002001  | RSS                                                 |                                   |
| C557    | 02116 | 125061R | JMP DISCR, I                                        | YES, TAKE P+1 EXIT FROM DISCR     |
| C558    | 02117 | 016123R | JSB RSECT                                           |                                   |
| C559    | 02120 | 162144R | DWDS LDA MLOCN, I                                   | GET NEXT WORD FROM BUFFER         |

## BASIC INTERPRETER CONTROL

```

C560 02121 036144R      ISZ MLOCN      BUMP POINTER
C561 02122 126105R      JMP DRORD,I    EXIT TO DISCR
C562**
C563***      READ A SECTOR FROM DISK FILE
C564**
C565 02123 000000      RSECT NOP
C566 02124 016005X      JSB EXEC
C567 02125 002134R      DEF **7      READ NEXT SECTOR
C568 02126 000130R      DEF .14
C569 02127 000055      DEF .2
C570 02130 013457R      DEF FINIS+100      OF
C571 02131 000172R      DEF .128
C572 02132 002137R      DEF FNAME      DISK FILE
C573 02133 002143R      DEF RLSEC
C574 02134 036143R      ISZ RLSEC      INCREMENT RELATIVE SECTOR NUMBER
C575 02135 126123R      JMP RSECT,I
C576*
C577*
C578 01160      PNTR EQU IFIX      BYTE POINTER
C579 00045      .TEMP EQU TEMPS    TEMPORARY CHARACTER STORAGE
C580 02136 002137R FADR DEF **1    FILE NAME ADDRESS
C581 02137 000000 FNAME BSS 3      HOLDS FILE NAME
C582 02142 000000 NSECT BSS 1      NUMBER OF SECTORS IN FILE
C583 02143 000000 RLSEC BSS 1      RELATIVE FILE SECTOR TO BE READ
C584 02144 000000 MLOCN BSS 1      SECTOR BUFFER POINTER
C585 02145 000000 ENTLN BSS 1      SECTOR COUNTER
C586 02146 013657R DNBUF DEF FINIS+228 END OF SECTOR BUFFER
C587 02147 013457R DBUFF DEF FINIS+100 START OF SECTOR BUFFER
C588 02150 000000 .DFLG BSS 1      DISK I/O FLAG
C589 02151 000000 SBUF BSS 1      INPUT BUFFER POINTER
C590 02152 020040 SPSP OCT 20040    (BLANK-BLANK)
C591 02153 000000 STLEN BSS 1      HOLDS STATEMENT WORD COUNT
C592 02154 000000 TERMS BSS 1      WORD COUNTER

```

## CHECK SYNTAX AND TRANSLITERATE

```

C594*
C595* *****
C596****
C597*** CHECK SYNTAX OF STATEMENT ***
C598****
C599* *****
C600*
C601**
C602*** DETERMINE SEQUENCE NUMBER **
C603**
C604 02155 065033R SYNTAX LDB .LNUM GET OLD SEQUENCE #
C605 02156 007004 CMB,INB MAKE NEGATIVE
C606 02157 046015R ADB OLDLN IS IT HIGHEST OLD SEQ #
C607 02160 006020 SSB
C608 02161 016223R JSB SAVIT YES, LDB .LNUM
C609 02162 065015R LDB OLDLN NO
C610 02163 075015R STB OLDLN AND SAVE
C611 02164 016400R JSB INTCK RECORD
C612 02165 000256R DEF MAXSN SEQUENCE NUMBER
C613 02166 036022R ISZ SBPTR SAVE SPACE FOR LENGTH WORD
C614 02167 075033R STB .LNUM SAVE LINE NUMBER
C615 02170 065021R LDB SBUFA SET
C616 02171 005004 INB TEMP TO
C617 02172 075046R STB TEMP (SBUFA)+1
C618**
C619*** DETERMINE STATEMENT TYPE **
C620**
C621 02173 050065 CPA .10 NULL STATEMENT?
C622 02174 026466R JMP DLSTM YES, DELETE IT
C623 02175 172022R STA SBPTR,I NO, RECORD NEXT CHARACTER
C624 02176 062106R LDA STIYP PRINT-TABLE ADDRESS
C625 02177 065273R LDB TBLX -(NUMBER OF ENTRIES)
C626 02200 016242R JSB TBSRH FIND STATEMENT TYPE
C627 02201 016274R JSB ERROR NOT FOUND
C628 02202 064042 SYNE1 LDB M9 SET MULTIPLE STORE
C629 02203 075300R STB MSFLG TO FALSE
C630 02204 065010C LDB PBPTR NULL
C631 02205 056007C CPB PBUFF PROGRAM?
C632 02206 002001 RSS YES
C633 02207 026213R JMP SYNT1 NO
C634 02210 065002R LDB FWAM INSURE NO
C635 02211 075007C STB PBUFF SPURIOUS COMMON
C636 02212 076010C STB PBPTR EXISTS
C637 02213 065013R SYNT1 LDB ASBTB
C638 02214 075045R STB TEMPS SET S-STACK POINTER
C639 02215 006400 CLB SET DEFINE FLAG
C640 02216 075302R STB DFLAG TO FALSE
C641 02217 075304R STB PFLAG SET PARAMETER FLAG TO FALSE
C642 02220 SYNT EQU *
C643 02220 001727 ALF,ALF COMPUTE
C644 02221 042101R ADA STBAS SYNTAX ROUTINE AND
C645 02222 124000 JMP 0,I BRANCH TO IT
C646 02223 000000 SAVIT NOP
C647 02224 065033R LDB .LNUM
C648 02225 036223R ISZ SAVIT

```

## CHECK SYNTAX AND TRANSLITERATE

```

C649 02226 125223R      JMP SAVIT,I
C650**
C651*** SINGLE CHARACTER AND/OR FORMULA OPERATORS **
C652**
C653 02227 000400  QUOTE OCT 400  ::
C654 02230 021040      ASC 1,"
C655 02231 001000  COMMA OCT 1000 ::
C656 02232 025040      ASC 1,,
C657 02233 001400  SMCLN OCT 1400 ::
C658 02234 035440      ASC 1,;
C659 02235 002001  RPARN OCT 2001 ::
C660 02236 024440      ASC 1,)
C661 02237 002401  RBRAC OCT 2401
C662 02240 055440      ASC 1,]
C663 02241 003002  SCMMA OCT 3002 ::
C664 02242 025040      ASC 1,,
C665 02243 003402  ASSUP OCT 3402 ::
C666 02244 035440      ASC 1,=
C667 02245 004007  PLUS  OCT 4007 ::
C668 02246 025440      ASC 1,+
C669 02247 004407  MINUS OCT 4407 ::
C670 02250 025440      ASC 1,-
C671 02251 005010  TIMES OCT 5010 ::
C672 02252 025040      ASC 1,*
C673 02253 005410  DIV   OCT 5410 ::
C674 02254 027440      ASC 1,/
C675 02255 006012  EXPS  OCT 6012 ::
C676 02256 057040      ASC 1,^
C677 02257 006405  GTR   OCT 6405 ::
C678 02260 037040      ASC 1,>
C679 02261 007005  LSS   OCT 7005
C680 02262 035040      ASC 1,<
C681 02263 007405  ONEQL OCT 7405 ::
C682 02264 021440      ASC 1,#
C683 02265 010005  EQUAL OCT 10005 ::
C684 02266 035440      ASC 1,=
C685 02267 010411  UNMIN OCT 10411 ::
C686 02270 025440      ASC 1,-
C687 02271 011020  LBRAC OCT 11020 ::
C688 02272 055440      ASC 1,[
C689 02273 011420  LPARN OCT 11420 ::
C690 02274 024040      ASC 1,(
C691 02275 012011  UPLUS OCT 12011 ::
C692 02276 025440      ASC 1,+
C693 02277 012403  GRUP  OCT 12403 ::
C694 02300 000000  MSFLG NOP
C695 02301 013004  ANDOP OCT 13004 ::
C696 02302 000000  DFLAG NOP
C697 02303 013411  NOTOP OCT 13411 ::
C698 02304 000000  PFLAG NOP
C699 02305 014005  GTREQ OCT 14005 ::
C700 02306 000000  UFLAG NOP
C701 02307 014405  LSSEQ OCT 14405
C702*
C703***

```

\*\*\*

## CHECK SYNTAX AND TRANSLITERATE

C704\*\* LET STATEMENT SYNTAX \*\*

C705\*\*\* \*\*\*

C706\*

|      |       |         |       |     |                           |
|------|-------|---------|-------|-----|---------------------------|
| C707 | 02310 | 005400  | LETS  | CLB | SET "NO STORE" FLAG (B)=0 |
| C708 | 02311 | 077534R |       | S1B | SFLAG                     |
| C709 | 02312 | 069045  |       | LDA | M8                        |
| C710 | 02313 | 072300R |       | S1A | MSFLG                     |
| C711 | 02314 | 017120R |       | JSB | FSC                       |
| C712 | 02315 | 057534R |       | CFB | SFLAG                     |
| C713 | 02316 | 015274R |       | JSB | ERROR                     |
| C714 | 02317 |         | SYNE2 | EQU | *                         |

C715\*\*

C716\*\*\* CHECK FOR END OF STATEMENT \*\*

C717\*\*

|      |       |         |      |     |       |
|------|-------|---------|------|-----|-------|
| C718 | 02317 | 050065  | EQST | CPA | .10   |
| C719 | 02320 | 025476R |      | JMP | ACTST |
| C720 | 02321 | 025071R |      | JMP | NOEOF |

|  |  |  |  |  |                       |
|--|--|--|--|--|-----------------------|
|  |  |  |  |  | END-OF-STATEMENT?     |
|  |  |  |  |  | YES ACCEPT STATEMENT  |
|  |  |  |  |  | NO, ILLEGAL CHARACTER |



## CHECK SYNTAX AND TRANSLITERATE

```

C722*
C723***          ***
C724** DIM STATEMENT SYNTAX **
C725***          ***
C726*
C727 02322 036302R DIMS ISZ DFLAG SET DFLAG TO TRUE
C728 02323 017534R JSB ARRYS CHECK AN ARRAY
C729 02324 026476R JMP ACTST DONE
C730 02325 026323R JMP DIMS+1 WAS A COMMA, CONTINUE
C731*
C732***          ***
C733** COM STATEMENT SYNTAX **
C734***          ***
C735*
C736 02326 065010C COMS LDB PBPTR HAS PROGRAM BUFFER
C737 02327 056002R CPB FWAM BEEN MOVED?
C738 02330 002001 RSS NO
C739 02331 016274R JSB ERROR YES, ILLEGAL COM
C740 02332 076054R SYNE3 STB TEMPS+7 SET ARRAY POINTER
C741 02333 036302R ISZ DFLAG SET DEFINE FLAG TO TRUE
C742 02334 003400 COMS1 CCA SET COMMON FLAG
C743 02335 072304R STA PFLAG TO TRUE
C744 02336 017534R JSB ARRYS CHECK AN ARRAY
C745 02337 002001 RSS DONE
C746 02340 026334R JMP COMS1 MORE ARRAYS
C747 02341 065054R LDB TEMPS+7 FETCH UPDATED POINTER
C748 02342 076007C STB PBUFF SET PROGRAM BUFFER ADDRESS
C749 02343 076010C STB PBPTR SET PROGRAM BUFFER POINTER
C750 02344 026476R JMP ACTST EXIT
C751*
C752***          ***
C753** DEF STATEMENT SYNTAX **
C754***          ***
C755*
C756 02345 017645R DEFS JSB LTR
C757 02346 026356R JMP SYNE4 FIRST
C758 02347 062047R LDA TEMP1
C759 02350 001727 ALF,ALF TWO CHARACTERS
C760 02351 032050R IOR TEMP2
C761 02352 052257R CPA FN 'FN'?
C762 02353 002001 RSS YES
C763 02354 026356R JMP SYNE4 NO
C001 02355 017645R JSB LTR LETTER FOLLOWS?
C002 02356 016274R SYNE4 JSB ERROR NO
C003 02357 062047R LDA TEMP1 YES, RECORD A
C004 02360 065156R LDB .50 **:FUNCTION
C005 02361 017660R JSB STRUP NAME
C006 02362 062050R LDA TEMP2 RETRIEVE CHARACTER
C007 02363 017671R JSB LPCK LEFT PARENTHESIS?
C008 02364 032263R IOR FLGHT YES, SET FORMAL
C009 02365 172022R STA SBPTR,1 PARAMETER BIT
C010 02366 017562R JSB VARUP FETCH SIMPLE VARIABLE
C011 02367 000000 NOP NONE FOUND
C012 02370 016274R JSB ERROR SUBSCRIPTED VARIABLE FOUND
C013 02371 017701R SYNE5 JSB RPCK RECORD A RIGHT PARENTHESIS

```

## CHECK SYNTAX AND TRANSLITERATE

|         |       |                  |                  |                                 |
|---------|-------|------------------|------------------|---------------------------------|
| C014    | 02372 | 007400           | CCB              | ASSIGNMENT                      |
| C015    | 02373 | 017066R          | JSB SYMCK        |                                 |
| C016    | 02374 | 002242R          | DEF ASSOP-1      | OPERATOR?                       |
| C017    | 02375 | 015274R          | SYNE6 JSB ERROR  | NO                              |
| C018    | 02376 | 060051           | LDA M2           | YES,                            |
| C019    | 02377 | 042022R          | ADA SBPTR        | RETRIEVE                        |
| C020    | 02400 | 160000           | LDA 0,I          | PARAMETER                       |
| C021    | 02401 | 012176R          | AND MSK1         | AND                             |
| C022    | 02402 | 072304R          | STA PFLAG        | SAVE IT                         |
| C023    | 02403 | 017120R          | JSB FSC          | FETCH DEFINING FORMULA          |
| C024    | 02404 | 025317R          | JMP EOST         | END-OF-STATEMENT TEST           |
| C025*   |       |                  |                  |                                 |
| C026*** |       |                  |                  |                                 |
| C027**  | REM   | STATEMENT SYNTAX | **               |                                 |
| C028    | 02405 | 102501           | REMS LIA 1       | IS SW 13 SET?                   |
| C029    | 02406 | 012210R          | AND B20K         |                                 |
| C030    | 02407 | 002002           | SZA              |                                 |
| C031    | 02410 | 027511R          | JMP PEXMK        | YES, DELETE THE REM             |
| C032    | 02411 | 060055           | LDA .10          |                                 |
| C033    | 02412 | 015437R          | JSB CHRST        |                                 |
| C034    | 02413 | 025476R          | JMP ACTST        |                                 |
| C035    | 02414 | 027511R          | JMP PEXMK        |                                 |
| C036*   |       |                  |                  |                                 |
| C037*** |       |                  |                  |                                 |
| C038**  | IF    | STATEMENT SYNTAX | **               |                                 |
| C039*** |       |                  |                  |                                 |
| C040*   |       |                  |                  |                                 |
| C041    | 02415 | 017120R          | IFS JSB FSC      | GET DECISION FORMULA            |
| C042    | 02416 | 172022R          | STA SBPTR,I      | TABLE                           |
| C043    | 02417 | 062116R          | LDA ATHEN        | SEARCH                          |
| C044    | 02420 | 007400           | CCB              | FOR                             |
| C045    | 02421 | 015242R          | JSB TBSRH        | 'THEN'                          |
| C046    | 02422 | 015274R          | JSB ERROR        | NOT FOUND                       |
| C047    | 02423 | SYNE7            | EQU *            | GET STATEMENT LABEL NUMBER      |
| C048    | 02423 | 035022R          | ISZ SBPTR        |                                 |
| C049    | 02424 | 017377R          | JSB GETCR        |                                 |
| C050    | 02425 | 025070R          | JMP EOF          |                                 |
| C051    | 02426 | 017366R          | JSB LETCK        | IS NEXT CHAR. A LETTER?         |
| C052    | 02427 | 025436R          | JMP IFS1         | NO ADD GOTO CODE TO BUFFER      |
| C053    | 02430 | 172022R          | STA SBPTR,I      | YES, SAVE CHAR TEMPORARILY      |
| C054    | 02431 | 062106R          | LDA STIYP        | FIND 'CONDITIONAL EXEC'         |
| C055    | 02432 | 065273R          | LDB TBLX         | STATEMENT TYPE                  |
| C056    | 02433 | 015242R          | JSB TBSRH        |                                 |
| C057    | 02434 | 015274R          | JSB ERROR        | NOT FOUND, ERROR!               |
| C058    | 02435 | 025220R          | SYE1 JMP SYNT    | FOUND, BRANCH TO SYNTAX ROUTINE |
| C059    | 02436 | 017416R          | IFS1 JSB BCKSP   |                                 |
| C060    | 02437 | 062044R          | LDA GOTO         | REPLACE SEQUENCE NUMBER BY      |
| C061    | 02440 | 040047           | ADA M4           | GO TO SEQUENCE NUMBER           |
| C062    | 02441 | 172022R          | STA SBPTR,I      |                                 |
| C063*   |       |                  |                  |                                 |
| C064*** |       |                  |                  |                                 |
| C065**  | GO    | TO AND GOSUB     | STATEMENT SYNTAX | **                              |
| C066*** |       |                  |                  |                                 |
| C067    | 02442 | 017120R          | GOTOS JSB FSC    | FETCH AND RECORD FORMULA        |
| C068    | 02443 | 025317R          | JMP EOST         | END-OF-STATEMENT TEST           |

## CHECK SYNTAX AND TRANSLITERATE

```

C069*
C070*
C071***          ***
C072**  FOR STATEMENT SYNTAX **
C073***          ***
C074*
C075  02444 017562R FORS JSB VAROP    FETCH SIMPLE VARIABLE
C076  02445 000000      NOP           NONE FOUND
C077  02446 015274R SYNE8 JSB ERROR    SUBSCRIPTED VARIABLE FOUND
C078  02447 007400      CCB
C079  02450 017066R     JSB SYMCK      ASSIGNMENT
C080  02451 002242R     DEF ASSOP-1    OPERATOR?
C081  02452 025375R     JMP SYNE6      NO
C082  02453 017120R     JSB FSC        YES, FETCH INITIAL VALUE FORMULA
C083  02454 172022R     STA SBPTR,1    LOOK
C084  02455 062117R     LDA ATU        FOR
C085  02456 007400      CCB            THE
C086  02457 015242R     JSB TBSRH      'TO'
C087  02460 015274R     JSB ERROR      MISSING
C088  02461 017120R SYNE9 JSB FSC      GET LIMIT FORMULA
C089  02462 050065      CPA .10        END-OF-STATEMENT?
C090  02463 025476R     JMP ACTST      YES
C091  02464 007400      CCB            NO, ERASE
C092  02465 045022R     ADB SBPTR      ZERO
C093  02466 075022R     STB SBPTR      WORD
C094  02467 172022R     STA SBPTR,1    NOW
C095  02470 062120R     LDA ASTEP      LOOK
C096  02471 007400      CCB            FOR
C097  02472 015242R     JSB TBSRH      THE 'STEP'
C098  02473 015274R     JSB ERROR      MISSING
C099  02474 017120R SYE10 JSB FSC      GET STEP SIZE FORMULA
C100  02475 025317R     JMP EOST      END-OF-STATEMENT TEST
C101*
C102***          ***
C103**  NEXT STATEMENT SYNTAX **
C104***          ***
C105*
C106  02476 017562R NXTS JSB VAROP    FETCH SIMPLE VARIABLE
C107  02477 000000      NOP           NONE FOUND
C108  02500 025446R     JMP SYNE8      SUBSCRIPTED VARIABLE FOUND
C109  02501 025317R     JMP EOST      END-OF-STATEMENT TEST
C110*
C111***          ***
C112**  END, STOP, RESTORE, RETURN STATEMENT SYNTAX **
C113***          ***
C114*
C115  02502 062023R ENDS LDA TFLAG
C116  02503 002002      SZA
C117  02504 035025R     ISZ ENFLG
C118  02505 062150R     LDA .DPLG      IS INPUT FROM DISK?
C119  02506 002002      SZA
C120  02507 035025R     ISZ ENFLG      YES, SET FLAG ON END STATEMENT
C121  02510 035022R     ISZ SBPTR
C122  02511 017377R     JSB GETCR      END-OF-STATEMENT?
C123  02512 025476R     JMP ACTST      YES

```

## CHECK SYNTAX AND TRANSLITERATE

|         |       |                  |                   |                              |
|---------|-------|------------------|-------------------|------------------------------|
| C124    | 02513 | 025071R          | JMP NOEOF         | NO                           |
| C125*   |       |                  |                   |                              |
| C126*** |       |                  | ***               |                              |
| C127**  | WAIT  | STATEMENT SYNTAX | **                |                              |
| C128*** |       |                  | ***               |                              |
| C129*   |       |                  |                   |                              |
| C130    | 02514 | 017744R          | WAITS JSB GETPF   |                              |
| C131    | 02515 | 025317R          | JMP EOST          | END-OF-STATEMENT TEST        |
| C132*** |       |                  |                   |                              |
| C133**  | CALL  | STATEMENT SYNTAX |                   |                              |
| C134*** |       |                  |                   |                              |
| C135    | 02516 | 017377R          | CALLS JSB GETCR   | FETCH AND                    |
| C136    | 02517 | 025070R          | JMP EOF           | RECORD                       |
| C137    | 02520 | 035022R          | ISZ SBPTR         | LEFT                         |
| C138    | 02521 | 017671R          | JSB LPCK          | PARENTHESIS                  |
| C139    | 02522 | 015362R          | JSB PRGIN         | FETCH AND RECORD             |
| C140    | 02523 | 000077           | DEF D100          | SUBROUTINE NUMBER            |
| C141    | 02524 | 072047R          | STA TEMP1         |                              |
| C142    | 02525 | 017115R          | JSB FND5B         | FIND                         |
| C143    | 02526 | 160001           | LDA 1,1           | NUMBER                       |
| C144    | 02527 | 001727           | ALF,ALF           | OF                           |
| C145    | 02530 | 010071           | AND .31           | PARAMETERS                   |
| C146    | 02531 | 003000           | CMA               | RECORD                       |
| C147    | 02532 | 072054R          | STA TEMPS+7       | COMPLEMENT - 1               |
| C148    | 02533 | 062047R          | LDA TEMP1         | RETRIEVE CHARACTER           |
| C149    | 02534 | 007400           | CALL2 CCB         |                              |
| C150    | 02535 | 017066R          | JSB SYMCK         | COMMA?                       |
| C151    | 02536 | 002230R          | DEF COMMA-1       |                              |
| C152    | 02537 | 025545R          | JMP CALL3         | NO                           |
| C153    | 02540 | 035054R          | CALL5 ISZ TEMPS+7 | YES, MORE                    |
| C154    | 02541 | 002001           | RSS               | PARAMETERS PERMITTED?        |
| C155    | 02542 | 015274R          | SYE11 JSB ERROR   | NO                           |
| C156    | 02543 | 017120R          | JSB FSC           | YES, FETCH                   |
| C157    | 02544 | 025534R          | JMP CALL2         | PARAMETER FORMULA            |
| C158    | 02545 | 035054R          | CALL3 ISZ TEMPS+7 | ALL PARAMETERS PRESENT?      |
| C159    | 02546 | 025542R          | JMP SYE11         | NO                           |
| C160    | 02547 | 065272R          | LDB PARM          |                              |
| C161    | 02550 | 005002           | SZB               |                              |
| C162    | 02551 | 017701R          | JSB RPCK          | YES, FETCH RIGHT PARENTHESIS |
| C163    | 02552 | 025317R          | JMP EOST          | END-OF-STATEMENT TEST        |
| C164*   |       |                  |                   |                              |
| C165*** |       |                  | ***               |                              |
| C166**  | DATA  | STATEMENT SYNTAX | **                |                              |
| C167*** |       |                  | ***               |                              |
| C168*   |       |                  |                   |                              |
| C169    | 02553 | 015402R          | DATAS JSB CONST   | FETCH A CONSTANT             |
| C170    | 02554 | 025426R          | JMP SYE12-1       | NONE FOUND                   |
| C171    | 02555 | 017754R          | JSB NUMOP         | FIX UP PRECEDING OPERATOR    |
| C172    | 02556 | 007400           | CCB               | CHECK                        |
| C173    | 02557 | 017066R          | JSB SYMCK         | FOR A                        |
| C174    | 02560 | 002230R          | DEF COMMA-1       | COMMA                        |
| C175    | 02561 | 025317R          | JMP EOST          | END-OF-STATEMENT TEST        |
| C176    | 02562 | 025553R          | JMP DATAS         | FETCH ANOTHER NUMBER         |
| C177*   |       |                  |                   |                              |
| C178*** |       |                  | ***               |                              |

## CHECK SYNTAX AND TRANSLITERATE

C179\*\* READ AND INPUT STATEMENT SYNTAX \*\*

C180\*\*\*

\*\*\*

C181\*

|      |       |         |                 |                         |
|------|-------|---------|-----------------|-------------------------|
| C182 | 02563 | 017562R | READS JSB VAROP | RECORD VARIABLE OPERAND |
| C183 | 02564 | 016274R | JSB ERROR       | MISSING                 |
| C184 | 02565 | 000000  | SYE13 NOP       |                         |
| C185 | 02566 | 007400  | CCB             | CHECK                   |
| C186 | 02567 | 017066R | JSB SYMCK       | FOR A                   |
| C187 | 02570 | 002230R | DEF COMMA-1     | COMMA                   |
| C188 | 02571 | 002001  | RSS             |                         |
| C189 | 02572 | 025563R | JMP READS       | IS, FETCH NEXT ITEM     |
| C190 | 02573 | 005400  | CLB             | APPEND                  |
| C191 | 02574 | 175022R | STB SBPTR, I    | END-OF-FORMULA          |
| C192 | 02575 | 035022R | ISZ SBPTR       | OPERATOR                |
| C193 | 02576 | 025317R | JMP EOST        | END OF STATEMENT TEST   |

C194\*

C195\*\*\*

\*\*\*

C196\*\* PRINT STATEMENT SYNTAX \*\*

C197\*\*\*

\*\*\*

C198\*

|      |       |         |                    |                              |
|------|-------|---------|--------------------|------------------------------|
| C199 | 02577 | 064051  | PRIN1 LDB M2       | NO,                          |
| C200 | 02600 | 017066R | JSB SYMCK          | COMMA OR                     |
| C201 | 02601 | 002230R | DEF COMMA-1        | SEMICOLON?                   |
| C202 | 02602 | 025610R | JMP PRIN2          | NO                           |
| C203 | 02603 | 003400  | PRINS CCA          | YES, ENABLE                  |
| C204 | 02604 | 172046R | STA TEMP, I        | FORMULA                      |
| C205 | 02605 | 035022R | ISZ SBPTR          |                              |
| C206 | 02606 | 017377R | JSB GETCR          | END-OF-STATEMENT?            |
| C207 | 02607 | 025476R | JMP ACTST          | YES                          |
| C208 | 02610 | 007400  | PRIN2 CCB          |                              |
| C209 | 02611 | 017066R | JSB SYMCK          | QUOTE?                       |
| C210 | 02612 | 002226R | DEF QUOTE-1        |                              |
| C211 | 02613 | 025627R | JMP PRIN3          | NO                           |
| C212 | 02614 | 062143R | LDA .34            | YES, SET QUOTE AS TERMINATOR |
| C213 | 02615 | 015437R | JSB CHRST          | CHARACTER AND FETCH STRING   |
| C214 | 02616 | 016274R | JSB ERROR          | MISSING QUOTE                |
| C215 | 02617 | 062227R | SYE14 LDA QUOTE    | RECORD                       |
| C216 | 02620 | 172022R | STA SBPTR, I       | QUOTE                        |
| C217 | 02621 | 035022R | ISZ SBPTR          |                              |
| C218 | 02622 | 017377R | JSB GETCR          | END-OF-STATEMENT?            |
| C219 | 02623 | 025476R | JMP ACTST          | YES                          |
| C220 | 02624 | 007400  | CCB                | ENABLE                       |
| C221 | 02625 | 175046R | STB TEMP, I        | FORMULA                      |
| C222 | 02626 | 025577R | JMP PRIN1          | NO                           |
| C223 | 02627 | 135046R | PRIN3 ISZ TEMP, I  | TAB OR FORMULA PERMITTED?    |
| C224 | 02630 | 016274R | JSB ERROR          | NO                           |
| C225 | 02631 | 172022R | SYE15 STA SBPTR, I | SEARCH                       |
| C226 | 02632 | 062122R | LDA ATAB           | FOR                          |
| C227 | 02633 | 007400  | CCB                | 'TAB'                        |
| C228 | 02634 | 016242R | JSB TBSRH          |                              |
| C229 | 02635 | 002401  | CLA, RSS           | NOT FOUND                    |
| C230 | 02636 | 062224R | LDA TABCN          |                              |
| C231 | 02637 | 007400  | CCB                | BACKUP                       |
| C232 | 02640 | 045022R | ADB SBPTR          | TO WORD WITH                 |
| C233 | 02641 | 075022R | STB SBPTR          | PREVIOUS OPERATOR            |

## CHECK SYNTAX AND TRANSLITERATE

|         |       |                  |             |                                  |
|---------|-------|------------------|-------------|----------------------------------|
| 0234    | 02642 | 002003           | SZA,RSS     | 'TAB' ?                          |
| 0235    | 02643 | 026653R          | JMP PRIN4   | NO                               |
| 0236    | 02644 | 132022R          | IOR SBPTR,I |                                  |
| 0237    | 02645 | 172022R          | STA SBPTR,I | YES, RECORD IT                   |
| 0238    | 02646 | 017744R          | JSB GETPF   | FETCH PARAMETER                  |
| 0239    | 02647 | 006400           | CLB         | FOLLOW                           |
| 0240    | 02650 | 176022R          | STB SBPTR,I | WITH A                           |
| 0241    | 02651 | 036022R          | ISZ SBPTR   | ZERO                             |
| 0242    | 02652 | 026655R          | JMP PRIN5   |                                  |
| 0243    | 02653 | 017416R PRIN4    | JSB BCKSP   | BACKSPACE OVER LAST CHARACTER    |
| 0244    | 02654 | 017120R          | JSB FSC     | FETCH FORMULA                    |
| 0245    | 02655 | 050065 PRIN5     | CPA .10     | END-OF-STATEMENT?                |
| 0246    | 02656 | 026476R          | JMP ACTST   | YES                              |
| 0247    | 02657 | 026577R          | JMP PRIN1   | NO                               |
| 0248*   |       |                  |             |                                  |
| 0249*** |       |                  | ***         |                                  |
| 0250**  | MAT   | STATEMENT SYNTAX | **          |                                  |
| 0251*** |       |                  | ***         |                                  |
| 0252*   |       |                  |             |                                  |
| 0253    | 02660 | 017645R MATS     | JSB LTR     | FIRST                            |
| 0254    | 02661 | 016274R          | JSB ERROR   | TWO CHARACTERS                   |
| 0255    | 02662 | 017366R SYE16    | JSB LETCK   | LETTERS?                         |
| 0256    | 02663 | 026726R          | JMP MATS2   | NO                               |
| 0257    | 02664 | 036022R          | ISZ SBPTR   | YES, MOVE TO FRESH S-BUFFER WORD |
| 0258    | 02665 | 066047R          | LDB TEMP1   | RETRIEVE FIRST LETTER AND        |
| 0259    | 02666 | 005727           | BLF,BLF     | PUT IT IN THE                    |
| 0260    | 02667 | 030001           | IOR 1       | UPPER CHARACTER OF (A)           |
| 0261    | 02670 | 172022R          | STA SBPTR,I | SEARCH                           |
| 0262    | 02671 | 062107R          | LDA MATIO   | FUR                              |
| 0263    | 02672 | 064051           | LDB M2      | 'READ' OR                        |
| 0264    | 02673 | 016242R          | JSB TBSRH   | 'PRINT'                          |
| 0265    | 02674 | 016274R          | JSB ERROR   | NOT FOUND                        |
| 0266    | 02675 | 052213R SYE17    | CPA RDUP    | READ?                            |
| 0267    | 02676 | 026714R          | JMP MATS1   | YES                              |
| 0268    | 02677 | 017550R MATS0    | JSB ARRID   | RECORD ARRAY                     |
| 0269    | 02700 | 050065           | CPA .10     | END-OF-STATEMENT?                |
| 0270    | 02701 | 026476R          | JMP ACTST   | YES                              |
| 0271    | 02702 | 064051           | LDB M2      | NO,                              |
| 0272    | 02703 | 017066R          | JSB SYMCK   | COMMA OR                         |
| 0273    | 02704 | 002230R          | DEF COMMA-1 | SEMICOLON?                       |
| 0274    | 02705 | 016274R          | JSB ERROR   | NO                               |
| 0275    | 02706 | 017377R SYE18    | JSB GETCR   | END-OF-STATEMENT?                |
| 0276    | 02707 | 026712R          | JMP *+3     | YES                              |
| 0277    | 02710 | 017416R          | JSB BCKSP   | NO                               |
| 0278    | 02711 | 026677R          | JMP MATS0   |                                  |
| 0279    | 02712 | 036022R          | ISZ SBPTR   | INCLUDE                          |
| 0280    | 02713 | 026476R          | JMP ACTST   | PARAMETER                        |
| 0281    | 02714 | 017550R MATS1    | JSB ARRID   | RECORD ARRAY                     |
| 0282    | 02715 | 017714R          | JSB MATSB   | IF SUBSCRIPT,                    |
| 0283    | 02716 | 000000           | NOP         | RECORD IT                        |
| 0284    | 02717 | 050065           | CPA .10     | END-OF-STATEMENT?                |
| 0285    | 02720 | 026476R          | JMP ACTST   | YES                              |
| 0286    | 02721 | 007400           | CCB         | NO                               |
| 0287    | 02722 | 017066R          | JSB SYMCK   |                                  |
| 0288    | 02723 | 002230R          | DEF COMMA-1 | COMMA?                           |

## CHECK SYNTAX AND TRANSLITERATE

|      |       |         |                 |                             |
|------|-------|---------|-----------------|-----------------------------|
| C289 | 02724 | 026705R | JMP SYE18-1     | NO                          |
| C290 | 02725 | 026714R | JMP MATS1       | YES                         |
| C291 | 02726 | 072050R | MATS2 STA TEMP2 |                             |
| C292 | 02727 | 062022R | LDA SBPTR       | SAVE                        |
| C293 | 02730 | 073477R | STA ARYAD       | OPERAND ADDRESS             |
| C294 | 02731 | 062047R | LDA TEMP1       | RETRIEVE FIRST LETTER       |
| C295 | 02732 | 065152R | LDB .46         | RECORD AN                   |
| C296 | 02733 | 017660R | JSB STROP       | ARRAY                       |
| C297 | 02734 | 062050R | LDA TEMP2       | RETRIEVE CHARACTER          |
| C298 | 02735 | 007400  | CCB             | ASSIGNMENT                  |
| C299 | 02736 | 017066R | JSB SYMCK       |                             |
| C300 | 02737 | 002242R | DEF ASSOP-1     | OPERATOR?                   |
| C301 | 02740 | 026575R | JMP SYNE6       | NO                          |
| C302 | 02741 | 163477R | LDA ARYAD,I     | YES, RETRIEVE               |
| C303 | 02742 | 012176R | AND MSK1        | AND SAVE                    |
| C304 | 02743 | 172046R | STA TEMP,I      | PREVIOUS ARRAY IDENTIFIER   |
| C305 | 02744 | 017645R | JSB LTR         | LETTER NEXT?                |
| C306 | 02745 | 027014R | JMP MATS4       | NO                          |
| C307 | 02746 | 017366R | JSB LETCK       | YES, SECOND LETTER?         |
| C308 | 02747 | 027030R | JMP MATS5       | NO                          |
| C309 | 02750 | 036022R | ISZ SBPTR       | YES,                        |
| C310 | 02751 | 066047R | LDB TEMP1       | CONCATENATE                 |
| C311 | 02752 | 005727  | BLF,BLF         | LETTERS                     |
| C312 | 02753 | 030001  | IOR 1           | AND                         |
| C313 | 02754 | 172022R | STA SBPTR,I     | SEARCH                      |
| C314 | 02755 | 062112R | LDA MATFN       | FOR                         |
| C315 | 02756 | 064046  | LDB M5          | ARRAY                       |
| C316 | 02757 | 016242R | JSB TBSRH       | FUNCTION                    |
| C317 | 02760 | 016274R | JSB ERROR       | NOT FOUND                   |
| C318 | 02761 | 001727  | SYE19 ALF,ALF   | FOUND                       |
| C319 | 02762 | 001723  | ALF,RAK         | POSITION IT,                |
| C320 | 02763 | 040062  | ADA .7          | COMPLETE OPERAND,           |
| C321 | 02764 | 007400  | CCB             | COMBINE                     |
| C322 | 02765 | 046022R | ADB SBPTR       | WITH                        |
| C323 | 02766 | 130001  | IOR 1,I         | OPERATOR,                   |
| C324 | 02767 | 032263R | IOR FLGBT       | ADD FLAG BIT,               |
| C325 | 02770 | 170001  | STA 1,I         | AND STORE                   |
| C326 | 02771 | 012176R | AND MSK1        | 'INV'                       |
| C327 | 02772 | 042253R | ADA D200        | OR                          |
| C328 | 02773 | 002021  | SSA,RSS         | 'TRN?                       |
| C329 | 02774 | 027002R | JMP MATS3       | YES                         |
| C330 | 02775 | 017377R | JSB GETCR       | NO, END-OF-STATEMENT?       |
| C331 | 02776 | 026476R | JMP ACTST       | YES                         |
| C332 | 02777 | 017714R | JSB MATSB       | NO, SUBSCRIPT?              |
| C333 | 03000 | 016274R | JSB ERROR       | NO                          |
| C334 | 03001 | 026071R | SYE20 JMP NOEOF |                             |
| C335 | 03002 | 017377R | MATS3 JSB GETCR |                             |
| C336 | 03003 | 026070R | JMP EOF         |                             |
| C337 | 03004 | 017671R | JSB LPCK        | GET LEFT PARENTHESIS        |
| C338 | 03005 | 017550R | JSB ARRID       | FETCH AND RECORD AN ARRAY   |
| C339 | 03006 | 017701R | JSB RPCK        | RECORD A RIGHT PARENTHESIS  |
| C340 | 03007 | 163477R | LDA ARYAD,I     | RETRIEVE                    |
| C341 | 03010 | 012176R | AND MSK1        | PREVIOUS ARRAY IDENTIFIER   |
| C342 | 03011 | 152046R | CPA TEMP,I      | MATCH LEFT-HAND SIDE ARRAY? |
| C343 | 03012 | 016274R | JSB ERROR       | YES                         |

## CHECK SYNTAX AND TRANSLITERATE

```

0344 03013 026476R SYE21 JMP ACTST NO
0345 03014 036022R MATS4 ISZ SBPTR
0346 03015 017671R JSB LPCK FETCH LEFT PARENTHESIS
0347 03016 017120R JSB FSC FETCH FORMULA
0348 03017 017701R JSB RPCK FETCH RIGHT PARENTHESIS
0349 03020 007400 CCB MULTIPLICATION
0350 03021 017066R JSB SYMCK OPERATOR?
0351 03022 002250R DEF TIMES-1
0352 03023 016274R JSB ERROR NO
0353 03024 017550R SYE22 JSB ARRID YES, FETCH AND RECORD ARRAY
0354 03025 050065 CPA .10 END-OF-STATEMENT?
0355 03026 026476R JMP ACTST YES
0356 03027 026071R JMP NOEOF NO
0357 03030 072050R MATS5 STA TEMP2
0358 03031 062022R LDA SBPTR SAVE
0359 03032 073477R STA ARYAD OPERAND ADDRESS
0360 03033 062047R LDA TEMP1 RETRIEVE
0361 03034 066152R LDB .46 AND RECORD
0362 03035 017660R JSB STROP ARRAY
0363 03036 062050R LDA TEMP2 END-OF-
0364 03037 050065 CPA .10 STATEMENT?
0365 03040 026476R JMP ACTST YES
0366 03041 064050 LDB M3 NO, MUST BE
0367 03042 017066R JSB SYMCK A '+',
0368 03043 002244R DEF PLUS-1 '- ', OR '*'
0369 03044 016274R JSB ERROR ISN'T
0370 03045 006400 SYE23 CLB IS, SET FOR FALSE
0371 03046 040063 ADA .8
0372 03047 052251R CPA TIMES '*'?
0373 03050 027065R JMP MATS7 YES
0374 03051 076304R MATS6 STB PFLAG NO, SET PFLAG
0375 03052 017550R JSB ARRID GET SECOND ARRAY
0376 03053 050065 CPA .10 END-OF-STATEMENT?
0377 03054 002001 RSS YES
0378 03055 026071R JMP NOEOF NO
0379 03056 036304R ISZ PFLAG WAS OPERATOR A '*'?
0380 03057 026476R JMP ACTST NO
0381 03060 163477R LDA ARYAD,I YES, RETRIEVE
0382 03061 012176R AND MSK1 SECOND ARRAY
0383 03062 152046R CPA TEMP,I MATCH LEFT-HAND SIDE ARRAY?
0384 03063 016274R SYE24 JSB ERROR YES
0385 03064 026476R JMP ACTST NO
0386 03065 163477R MATS7 LDA ARYAD,I RETRIEVE
0387 03066 012176R AND MSK1 ARRAY
0388 03067 007400 CCB SET FOR TRUE
0389 03070 152046R CPA TEMP,I MATCH LEFT-HAND SIDE ARRAY?
0390 03071 027065R JMP SYE24 YES
0391 03072 027051R JMP MATS6 NO
0392**
0393*** JUMP TABLE FOR STATEMENT SYNTAX **
0394**
0395 03073 002310R SYNTB DEF LETS LET
0396 03074 002322R DEF DIMS DIM
0397 03075 002326R DEF COMS COM
0398 03076 002345R DEF DEFS DEF

```



## CHECK SYNTAX AND TRANSLITERATE

|         |                        |         |                |                               |
|---------|------------------------|---------|----------------|-------------------------------|
| C399    | 03077                  | 002405R | DEF REMS       | REM                           |
| C400    | 03100                  | 002442R | DEF GOTOS      | GO TO                         |
| C401    | 03101                  | 002415R | DEF IFS        | IF                            |
| C402    | 03102                  | 002444R | DEF FORS       | FOR                           |
| C403    | 03103                  | 002476R | DEF NXTS       | NEXT                          |
| C404    | 03104                  | 002442R | DEF GOTOS      | GOSUB                         |
| C405    | 03105                  | 002510R | DEF ENDS+6     | RETURN                        |
| C406    | 03106                  | 002502R | DEF ENDS       | END                           |
| C407    | 03107                  | 002510R | DEF ENDS+6     | STOP                          |
| C408    | 03110                  | 002514R | DEF WAITS      | WAIT                          |
| C409    | 03111                  | 002516R | DEF CALLS      | CALL                          |
| C410    | 03112                  | 002553R | DEF DATAS      | DATA                          |
| C411    | 03113                  | 002563R | DEF READS      | READ                          |
| C412    | 03114                  | 002603R | DEF PRINS      | PRINT                         |
| C413    | 03115                  | 002563R | DEF READS      | INPUT                         |
| C414    | 03116                  | 002510R | DEF ENDS+6     | RESTORE                       |
| C415    | 03117                  | 002660R | DEF MATS       | MAT                           |
| C416*   |                        |         |                |                               |
| C417*** |                        |         | ***            |                               |
| C418**  | FORMULA SYNTAX CHECKER |         | **             |                               |
| C419*** |                        |         | ***            |                               |
| C420*   |                        |         |                |                               |
| C421    | 03120                  | 000000  | FSC NOP        |                               |
| C422    | 03121                  | 002400  | CLA            | SET LEFT PARENTHESIS          |
| C423    | 03122                  | 172045R | STA TEMPS,I    | COUNT TO ZERO                 |
| C424    | 03123                  | 003400  | FSC1 CCA       | SET UNARY FLAG                |
| C425    | 03124                  | 072306R | STA UFLAG      | TO TRUE                       |
| C426    | 03125                  | 017562R | FSC2 JSB VAROP | LOOK FOR VARIABLE OPERAND     |
| C427    | 03126                  | 027265R | JMP FSC9       | NOT FOUND                     |
| C428    | 03127                  | 027233R | JMP FSC6       | SUBSCRIPTED VARIABLE FOUND    |
| C429    | 03130                  | 017366R | JSB LETCK      | FOLLOWED BY LETTER?           |
| C430    | 03131                  | 027233R | JMP FSC6       | NO                            |
| C431    | 03132                  | 064051  | LDB M2         | YES, LOOK FOR                 |
| C432    | 03133                  | 017326R | JSB MCBCK      | 'AND' OR 'OR'                 |
| C433    | 03134                  | 062047R | LDA TEMP1      | NOT FOUND, FETCH PREVIOUS     |
| C434    | 03135                  | 001727  | ALF,ALF        | CHARACTER AND LEFT-JUSTIFY IT |
| C435    | 03136                  | 032050R | IOR TEMP2      | ADD LATEST CHARACTER          |
| C436    | 03137                  | 052257R | CPA FN         | 'FN'?                         |
| C437    | 03140                  | 027166R | JMP FSC4       | YES                           |
| C438    | 03141                  | 172022R | STA SBPTR,I    | NO,                           |
| C439    | 03142                  | 062111R | LDA PDFNS      | SEARCH FOR                    |
| C440    | 03143                  | 065233R | LDB M11        | PREDEFINED                    |
| C441    | 03144                  | 015242R | JSB TBSRH      | FUNCTION                      |
| C442    | 03145                  | 027152R | JMP FSC3       | NOT FOUND                     |
| C443    | 03146                  | 001727  | ALF,ALF        | ASSEMBLE                      |
| C444    | 03147                  | 001723  | ALF,RAR        | OPERAND                       |
| C445    | 03150                  | 032263R | IOR FLGBT      | ADD FLAG BIT                  |
| C446    | 03151                  | 027174R | JMP FSC5       |                               |
| C447    | 03152                  | 035306R | FSC3 ISZ UFLAG | 'NOT' PERMITTED?              |
| C448    | 03153                  | 027256R | JMP FSC8-1     | NO                            |
| C449    | 03154                  | 062121R | LDA ANOT       | YES,                          |
| C450    | 03155                  | 007400  | CCB            | SEARCH FOR                    |
| C451    | 03156                  | 015242R | JSB TBSRH      | 'NOT'                         |
| C452    | 03157                  | 027256R | JMP FSC8-1     | 'NOT' NOT FOUND               |
| C453    | 03160                  | 007400  | CCB            | RETRIEVE                      |

## CHECK SYNTAX AND TRANSLITERATE

|      |       |         |                 |                                  |
|------|-------|---------|-----------------|----------------------------------|
| 0454 | 03161 | 045022R | ADB SBPTR       | PREVIOUS WORD                    |
| 0455 | 03162 | 160001  | LDA 1,I         | WORD                             |
| 0456 | 03163 | 012220R | AND OPMSK       | SET TO                           |
| 0457 | 03164 | 170001  | STA 1,I         | NULL OPERAND                     |
| 0458 | 03165 | 027323R | JMP FSC14       |                                  |
| 0459 | 03166 | 017377R | FSC4 JSB GETCR  | IDENTIFYING                      |
| 0460 | 03167 | 025356R | JMP SYNE4       | FUNCTION                         |
| 0461 | 03170 | 017366R | JSB LETCK       | LETTER?                          |
| 0462 | 03171 | 025356R | JMP SYNE4       | NO                               |
| 0463 | 03172 | 040077  | ADA D100        | YES,                             |
| 0464 | 03173 | 001723  | ALF,RAR         | ASSEMBLE AND SAVE                |
| 0465 | 03174 | 040062  | FSC5 ADA .7 ::  |                                  |
| 0466 | 03175 | 072047R | STA TEMP1       | FUNCTION IDENTIFIER              |
| 0467 | 03176 | 007400  | CCB             | RETRIEVE                         |
| 0468 | 03177 | 045022R | ADB SBPTR       | PREVIOUS                         |
| 0469 | 03200 | 160001  | LDA 1,I         | PROGRAM WORD                     |
| 0470 | 03201 | 012220R | AND OPMSK       | EXTRACT OPERATOR,                |
| 0471 | 03202 | 032047R | IOR TEMP1       | APPEND OPERAND,                  |
| 0472 | 03203 | 170001  | STA 1,I         | AND RECORD                       |
| 0473 | 03204 | 017377R | JSB GETCR       | LEFT PARENTHESIS                 |
| 0474 | 03205 | 015274R | FSC61 JSB ERROR | OR                               |
| 0475 | 03206 | 017671R | JSB LPCK        | LEFT BRACKET?                    |
| 0476 | 03207 | 017357R | JSB FRCUR       | YES, SAVE LOCAL VARIABLES OF FSC |
| 0477 | 03210 | 017120R | JSB FSC         | FETCH ACTUAL PARAMETER           |
| 0478 | 03211 | 017334R | JSB FPOP        | RESTORE LOCAL VARIABLES OF FSC   |
| 0479 | 03212 | 017701R | JSB RPKC        | FETCH RIGHT PARENTHESIS          |
| 0480 | 03213 | 027276R | JMP FSC10+1     |                                  |
| 0481 | 03214 | 064051  | FSC7 LDB M2     | CHECK FOR                        |
| 0482 | 03215 | 017066R | JSB SYMCK       | RIGHT PARENTHESIS                |
| 0483 | 03216 | 002234R | DEF RPARN-1     | OR RIGHT BRACKET                 |
| 0484 | 03217 | 027257R | JMP FSC8        | NOT FOUND                        |
| 0485 | 03220 | 062202R | LDA B2000 ::    |                                  |
| 0486 | 03221 | 172022R | STA SBPTR,I     | RIGHT PARENTHESIS                |
| 0487 | 03222 | 062146R | LDA .41         | RESTORE RIGHT PARENTHESIS        |
| 0488 | 03223 | 007400  | CCB             | MATCHING                         |
| 0489 | 03224 | 145045R | ADB TEMPS,I     | LEFT                             |
| 0490 | 03225 | 005020  | SSB             | PARENTHESIS?                     |
| 0491 | 03226 | 027257R | JMP FSC8        | NO                               |
| 0492 | 03227 | 175045R | STB TEMPS,I     | YES                              |
| 0493 | 03230 | 036022R | ISZ SBPTR       |                                  |
| 0494 | 03231 | 017377R | JSB GETCR       | FETCH                            |
| 0495 | 03232 | 060065  | LDA .10         | CHARACTER                        |
| 0496 | 03233 | 050065  | FSC6 CPA .10    | END OF FORMULA?                  |
| 0497 | 03234 | 027257R | JMP FSC8        | YES                              |
| 0498 | 03235 | 072306R | STA UFLAG       | NO, SET UNARY FLAG TO FALSE      |
| 0499 | 03236 | 064046  | LDB M5          | SEARCH FOR A MULTICHARACTER      |
| 0500 | 03237 | 017326R | JSB MCHCK       | BINARY OPERATOR                  |
| 0501 | 03240 | 162022R | LDA SBPTR,I     | NOT FOUND,                       |
| 0502 | 03241 | 001727  | ALF,ALF         | RESTORE                          |
| 0503 | 03242 | 010073  | AND B177        | CHARACTER                        |
| 0504 | 03243 | 066300R | LDB MSFLG       | SEARCH                           |
| 0505 | 03244 | 017066R | JSB SYMCK       | FOR A                            |
| 0506 | 03245 | 002244R | DEF PLUS-1      | BINARY OPERATOR                  |
| 0507 | 03246 | 002001  | RSS             | NOT FOUND                        |
| 0508 | 03247 | 027305R | JMP FSC12       | FOUND                            |

## CHECK SYNTAX AND TRANSLITERATE

|         |                                               |         |                  |                                |
|---------|-----------------------------------------------|---------|------------------|--------------------------------|
| C509    | 03250                                         | 007400  | CCB              | ASSIGNMENT                     |
| C510    | 03251                                         | 017066R | JSB SYMCK        |                                |
| C511    | 03252                                         | 002242R | DEF ASSOP-1      | OPERATOR?                      |
| C512    | 03253                                         | 027214R | JMP FSC7         | NO                             |
| C513    | 03254                                         | 073534R | STA SFLAG        | YES, SET                       |
| C514    | 03255                                         | 027123R | JMP FSC1         | 'STORE OCCURRED' FLAG          |
| C515    | 03256                                         | 062050R | LDA TEMP2        | RETRIEVE LETTER                |
| C516    | 03257                                         | 166045R | FSC8 LDB TEMPS,I | ALL LEFT PARENTHESES           |
| C517    | 03260                                         | 006002  | SZB              | MATCHED?                       |
| C518    | 03261                                         | 016274R | FSC2 JSB ERROR   | NO                             |
| C519    | 03262                                         | 176022R | STB SBPTR,I      | YES, RECORD AN                 |
| C520    | 03263                                         | 036022R | ISZ SBPTR        | END-OF-FORMULA AND             |
| C521    | 03264                                         | 127120R | JMP FSC,I        | EXIT WITH CHARACTER IN (A)     |
| C522*   |                                               |         |                  |                                |
| C523    | 03265                                         | 052145R | FSC9 CPA .40     | LEFT                           |
| C524    | 03266                                         | 027301R | JMP FSC11        | PARENTHESIS                    |
| C525    | 03267                                         | 052170R | CPA B133         | OR LEFT BRACKET?               |
| C526    | 03270                                         | 027301R | JMP FSC11        | YES                            |
| C527    | 03271                                         | 006400  | CLB              | NO, SET SIGN                   |
| C528    | 03272                                         | 076041R | STB SIGN         | POSITIVE                       |
| C529    | 03273                                         | 016430R | JSB NUMCK        | NUMBER?                        |
| C530    | 03274                                         | 027310R | JMP FSC13        | NO                             |
| C531    | 03275                                         | 017754R | FSC10 JSB NUMOP  | YES, FIX UP PRECEDING OPERATOR |
| C532    | 03276                                         | 064042  | LDB M9           | UPDATE                         |
| C533    | 03277                                         | 076300R | STB MSFLG        | MULTIPLE STORE                 |
| C534    | 03300                                         | 027233R | JMP FSC6         | FLAG                           |
| C535    | 03301                                         | 036022R | FSC11 ISZ SBPTR  | YES                            |
| C536    | 03302                                         | 052207R | LDA B1140 ::     |                                |
| C537    | 03303                                         | 172022R | STA SBPTR,I      | IT AND                         |
| C538    | 03304                                         | 136045R | ISZ TEMPS,I      | COUNT IT                       |
| C539    | 03305                                         | 064042  | FSC12 LDB M9     | UPDATE                         |
| C540    | 03306                                         | 076300R | STB MSFLG        | MULTIPLE STORE FLAG            |
| C541    | 03307                                         | 027123R | JMP FSC1         | FLAG                           |
| C542    | 03310                                         | 036306R | FSC13 ISZ UFLAG  | UNARY OPERATORS PERMITTED?     |
| C543    | 03311                                         | 016274R | FSC2 JSB ERROR   | NO                             |
| C544    | 03312                                         | 066205R | LDB UNMNC        |                                |
| C545    | 03313                                         | 052147R | CPA .43          | '+'?                           |
| C546    | 03314                                         | 027320R | JMP *+4          | YES                            |
| C547    | 03315                                         | 052150R | CPA .45          | NO, '-'?                       |
| C548    | 03316                                         | 027321R | JMP *+3          | YES                            |
| C549    | 03317                                         | 027311R | JMP FSCE3        | NO                             |
| C550    | 03320                                         | 046200R | ADB B1400        |                                |
| C551    | 03321                                         | 036022R | ISZ SBPTR        | UNARY                          |
| C552    | 03322                                         | 176022R | STB SBPTR,I      | OPERATOR                       |
| C553    | 03323                                         | 064042  | FSC14 LDB M9     | UPDATE                         |
| C554    | 03324                                         | 076300R | STB MSFLG        | MULTIPLE STORE FLAG            |
| C555    | 03325                                         | 027125R | JMP FSC2         | FLAG                           |
| C556**  |                                               |         |                  |                                |
| C557*** | CHECK FOR A MULTICHARACTER BINARY OPERATOR ** |         |                  |                                |
| C558**  |                                               |         |                  |                                |
| C559    | 03326                                         | 000000  | MCBCK NOP        |                                |
| C560    | 03327                                         | 172022R | STA SBPTR,I      | SEARCH                         |
| C561    | 03330                                         | 062110R | LDA MCBOP        | FUR 'AND'                      |
| C562    | 03331                                         | 016242R | JSB TBSRH        | OR 'OR'                        |
| C563    | 03332                                         | 127320R | JMP MCBCK,I      | NOT FOUND                      |

## CHECK SYNTAX AND TRANSLITERATE

```

C564 03333 027305R      JMP FSC12      FOUND
C565**
C566*** RESTORE FSC LOCAL QUANTITIES **
C567**
C568 03334 000000 FPOP  NOP
C569 03335 072047R      STA TEMP1      SAVE CHARACTER
C570 03336 066045R      LDB TEMPS
C571 03337 044046      ADB M5
C572 03340 076045R      STB TEMPS      RESTORE S-STACK TOP
C573 03341 006004      INB
C574 03342 160001      LDA 1,I
C575 03343 072300R      STA MSFLG      RESTORE MULTIPLE STORE FLAG
C576 03344 006004      INB
C577 03345 160001      LDA 1,I
C578 03346 072306R      STA UFLAG      RESTORE UNARY OPERATOR FLAG
C579 03347 006004      INB
C580 03350 160001      LDA 1,I
C581 03351 073120R      STA FSC        RESTORE FSC RETURN ADDRESS
C582 03352 006004      INB
C583 03353 160001      LDA 1,I        RESTORE
C584 03354 073562R      STA VAROP      VAROP RETURN ADDRESS
C585 03355 062047R      LDA TEMP1      RETRIEVE CHARACTER
C586 03356 127334R      JMP FPOP,I
C587**
C588*** SAVE LOCAL QUANTITIES OF FSC **
C589**
C590 03357 000000 FRCUR NOP
C591 03360 066045R      LDB TEMPS      FETCH CURRENT S-STACK POINTER
C592 03361 006004      INB            UPDATE IT
C593 03362 062300R      LDA MSFLG      DUMP MULTIPLE STORE
C594 03363 170001      STA 1,I        FLAG ON S-STACK
C595 03364 006004      INB
C596 03365 062306R      LDA UFLAG      STACK UNARY OPERATOR
C597 03366 170001      STA 1,I        FLAG
C598 03367 006004      INB
C599 03370 063120R      LDA FSC        STACK FSC
C600 03371 170001      STA 1,I        RETURN ADDRESS
C601 03372 063562R      LDA VAROP      STACK VAROP RETURN ADDRESS
C602 03373 017375R      JSB SSUV      AND CHECK FOR S-STACK OVERFLOW
C603 03374 127357R      JMP FRCUR,I
C604**
C605*** PUT ITEM ON S-STACK AND CHECK FOR OVERFLOW **
C606**
C607 03375 000000 SSUV  NOP            STORE QUANTITY
C608 03376 006004      INB            ADVANCE S-STACK POINTER
C609 03377 170001      STA 1,I        SAVE ITEM IN (A)
C610 03400 006004      INB            ADVANCE S-STACK POINTER
C611 03401 076045R      STB TEMPS      AND RECORD IT
C612 03402 007004      CMB,INB
C613 03403 045000R      ADB LWBM      LAST WORD
C614 03404 006020      SSB            EXCEEDED?
C615 03405 016274R FSC4 JSB ERROR      YES
C616 03406 127375R      JMP SSUV,I
C617**
C618*** CHECK FOR SUBSCRIPT PART **

```

## CHECK SYNTAX AND TRANSLITERATE

C619\*\*

|      |       |         |                |        |                             |
|------|-------|---------|----------------|--------|-----------------------------|
| C620 | 03407 | 000000  | SBSCX          | NO     | CHARACTER IN (A)            |
| C621 | 03410 | 064051  | LDB M2         |        | LEFT BRACKET                |
| C622 | 03411 | 017066R | JSB SYMCK      | OR     |                             |
| C623 | 03412 | 002270R | DEF LBRAC-1    |        | LEFT PARENTHESIS?           |
| C624 | 03413 | 127407R | JMP SBSCX,I    |        | NO, RETURN VIA (P+1)        |
| C625 | 03414 | 037407R | ISZ SBSCX      |        | YES, SET RETURN TO (P+2)    |
| C626 | 03415 | 163477R | LDA ARYAD,I    | SET    |                             |
| C627 | 03416 | 012244R | AND SBCON      |        |                             |
| C628 | 03417 | 002004  | INA            | TO     |                             |
| C629 | 03420 | 173477R | STA ARYAD,I    |        | SINGLE SUBSCRIPT            |
| C630 | 03421 | 062206R | LDA B1100 ::   |        |                             |
| C631 | 03422 | 172022R | SIA SBPTR,I    |        | LEFT BRACKET                |
| C632 | 03423 | 005400  | CLB            |        | DIM OR COM                  |
| C633 | 03424 | 055302R | CPB DFLAG      |        | STATEMENT?                  |
| C634 | 03425 | 027477R | JMP SBSC3      | NO     |                             |
| C635 | 03426 | 015362R | JSB PRGIN      |        | FETCH INTEGER               |
| C636 | 03427 | 000075  | DEF M256       |        | SUBSCRIPT BOUND             |
| C637 | 03430 | 005727  | BLF, BLF       | SAVE   |                             |
| C638 | 03431 | 075047R | STB TEMP1      | BOUND  |                             |
| C639 | 03432 | 007400  | CCB            | IS THE |                             |
| C640 | 03433 | 017066R | JSB SYMCK      |        | NEXT CHARACTER              |
| C641 | 03434 | 002240R | DEF SCMMA-1    |        | A COMMA?                    |
| C642 | 03435 | 027442R | JMP SBSC1      | NO     |                             |
| C643 | 03436 | 137477R | ISZ ARYAD,I    |        | YES, NOTE SECOND SUBSCRIPT  |
| C644 | 03437 | 015362R | JSB PRGIN      |        | FETCH SECOND                |
| C645 | 03440 | 000075  | DEF M256       |        | INTEGER SUBSCRIPT BOUND     |
| C646 | 03441 | 002001  | RSS            |        |                             |
| C647 | 03442 | 005404  | SBSC1 CLB, INB |        | SET ONE-DIMENSIONAL CASE    |
| C648 | 03443 | 035304R | ISZ PFLAG      |        | COM STATEMENT?              |
| C649 | 03444 | 027454R | JMP SBSC2      | NO     |                             |
| C650 | 03445 | 072050R | STA TEMP2      |        | SAVE CHARACTER              |
| C651 | 03446 | 060001  | LDA 1          |        |                             |
| C652 | 03447 | 032047R | IOR TEMP1      |        | RETRIEVE FIRST BOUND        |
| C653 | 03450 | 017130R | JSB MDIM       |        | FIND STORAGE NEED           |
| C654 | 03451 | 042054R | ADA TEMPS+7    |        | UPDATE COM                  |
| C655 | 03452 | 072054R | STA TEMPS+7    |        | STORAGE POINTER             |
| C656 | 03453 | 062050R | LDA TEMP2      |        | RETRIEVE NEXT CHARACTER     |
| C657 | 03454 | 064051  | SBSC2 LDB M2   |        | RIGHT PARENTHESIS           |
| C658 | 03455 | 017066R | JSB SYMCK      | OR     |                             |
| C659 | 03456 | 002234R | DEF RPARN-1    |        | RIGHT BRACKET?              |
| C660 | 03457 | 027261R | JMP FSCE2      | NO     |                             |
| C661 | 03460 | 062203R | LDA B2400 ::   |        |                             |
| C662 | 03461 | 172022R | SIA SBPTR,I    |        | RIGHT BRACKET               |
| C663 | 03462 | 035022R | ISZ SBPTR      |        | ADJUST S-BUFFER POINTER     |
| C664 | 03463 | 017377R | JSB GETCH      |        | FETCH FOLLOWING             |
| C665 | 03464 | 060065  | LDA .10        |        | CHARACTER                   |
| C666 | 03465 | 065302R | LDB DFLAG      |        | DIM OR COM                  |
| C667 | 03466 | 005002  | SZB            |        | STATEMENT?                  |
| C668 | 03467 | 127407R | JMP SBSCX,I    | YES    |                             |
| C669 | 03470 | 017334R | JSB FPOP       |        | RESTORE FSC LOCAL VARIABLES |
| C670 | 03471 | 064051  | LDB M2         |        | RESTORE                     |
| C671 | 03472 | 045045R | ADB TEMPS      |        | S-STACK                     |
| C672 | 03473 | 075045R | SIB TEMPS      |        | POINTER                     |
| C673 | 03474 | 005004  | INB            |        | FETCH                       |

## CHECK SYNTAX AND TRANSLITERATE

|       |       |         |                |                            |
|-------|-------|---------|----------------|----------------------------|
| C674  | 03475 | 164001  | LDB 1,I        | RETURN ADDRESS             |
| C675  | 03476 | 124001  | JMP 1,I        | AND EXIT                   |
| C676  | 03477 | 063407R | SBSC3 LDA SBSC | SAVE                       |
| C677  | 03500 | 066045R | LDB TEMPS      | RETURN ADDRESS             |
| C678  | 03501 | 017375R | JSB SSUV       | ON S-STACK                 |
| C679  | 03502 | 017357R | JSB FRCUR      | SAVE FSC LOCAL VARIABLES   |
| C680  | 03503 | 064042  | LDB M9         | SET MULTIPLE STORE FLAG    |
| C681  | 03504 | 076300R | STB MSFLG      | TO FALSE                   |
| C682  | 03505 | 063477R | LDA ARYAD      | SAVE                       |
| C683  | 03506 | 066045R | LDB TEMPS      | OPERAND                    |
| C684* |       |         |                |                            |
| C685  | 03507 | 017375R | JSB SSUV       | ADDRESS                    |
| C686  | 03510 | 017120R | JSB FSC        | GET SUBSCRIPT FORMULA      |
| C687  | 03511 | 007400  | CCB            | CANCEL                     |
| C688  | 03512 | 046022R | ADB SBPTR      | END-OF-FORMULA             |
| C001  | 03513 | 076022R | STB SBPTR      | OPERATOR                   |
| C002  | 03514 | 064051  | LDB M2         | RESTORE                    |
| C003  | 03515 | 046045R | ADB TEMPS      | S-STACK                    |
| C004  | 03516 | 076045R | STB TEMPS      | POINTER                    |
| C005  | 03517 | 006004  | INB            | RESTORE                    |
| C006  | 03520 | 164001  | LDB 1,I        | OPERAND                    |
| C007  | 03521 | 077477R | STB ARYAD      | ADDRESS                    |
| C008  | 03522 | 007400  | CCB            | IS THE                     |
| C009  | 03523 | 017066R | JSB SYMCK      | NEXT CHARACTER             |
| C010  | 03524 | 002240R | DEF SCMA-1     | A COMMA?                   |
| C011  | 03525 | 027454R | JMP SBSC2      | NO                         |
| C012  | 03526 | 137477R | ISZ ARYAD,I    | YES, NOTE SECOND SUBSCRIPT |
| C013  | 03527 | 017120R | JSB FSC        | GET SUBSCRIPT FORMULA      |
| C014  | 03530 | 007400  | CCB            | CANCEL                     |
| C015  | 03531 | 046022R | ADB SBPTR      | END-OF-FORMULA             |
| C016  | 03532 | 076022R | STB SBPTR      | OPERATOR                   |
| C017  | 03533 | 027454R | JMP SBSC2      |                            |

## CHECK SYNTAX AND TRANSLITERATE

```

C019**
C020*** CHECK SYNTAX OF ARRAY DEFINITIONS **
C021**
C022 03534 000000  ARSYS NOP
C023 03535 017550R      JSB ARRID      FETCH ARRAY IDENTIFIER
C024 03536 017407R      JSB SBSCCK     RECORD A SUBSCRIPT
C025 03537 016274R      JSB ERROR      MISSING SUBSCRIPT
C026 03540 050065  ARRE1 CPA .10      END-OF-STATEMENT?
C027 03541 127534R      JMP ARSYS,1    YES, RETURN VIA (P+1)
C028 03542 007400      CCB             NO,
C029 03543 017066R      JSB SYMCK      MUST BE
C030 03544 002230R      DEF COMMA-1    A COMMA
C031 03545 026071R      JMP NOEOF     ISN'T
C032 03546 037534R      ISZ ARSYS     IS, RETURN
C033 03547 127534R      JMP ARSYS,1    VIA (P+2)
C034**
C035*** FETCH ARRAY IDENTIFIER **
C036**
C037 03550 000000  ARRID NOP
C038 03551 017645R      JSB LTR        FETCH LETTER
C039 03552 016274R      JSB ERROR      NONE FOUND
C040 03553 062022R  ARRE2 LDA SBPTR    SAVE
C041 03554 073477R      STA ARYAD     OPERAND ADDRESS
C042 03555 062047R      LDA TEMP1     RECORD
C043 03556 066152R      LDB .46       ARRAY
C044 03557 017660R      JSB STROP      IDENTIFIER
C045 03560 062050R      LDA TEMP2     RETRIEVE FOLLOWING CHARACTER
C046 03561 127550R      JMP ARRID,1
C047**
C048*** CHECK FOR VARIABLE OPERAND **
C049**
C050 03562 000000  VAROP NOP
C051 03563 017645R      JSB LTR        LETTER?
C052 03564 127562R      JMP VAROP,1    NO, EXIT VIA (P+1)
C053 03565 037562R      ISZ VAROP
C054 03566 052145R      CPA .40       LEFT PARENTHESIS?
C055 03567 027634R      JMP VAR05     YES
C056 03570 052170R      CPA B153     NO, LEFT BRACKET?
C057 03571 027634R      JMP VAR05     YES
C058 03572 037562R      ISZ VAROP     NO
C059 03573 017353R      JSB DIGCK     DIGIT?
C060 03574 027610R      JMP VAR01     NO
C061 03575 062047R      LDA TEMP1     YES, RETRIEVE LETTER,
C062 03576 046154R      ADB .46       AND RESTORE ASCII DIGIT
C063 03577 075047R      STB TEMP1
C064 03600 046242R      ADB D62 ::
C065 03601 006021      SSB,RSS ::
C066 03602 027311R      JMP FSCE3 ::
C067 03603 066047R      LDB TEMP1 ::
C068 03604 017660R      JSB STROP      RECORD VARIABLE
C069 03605 017377R      JSB GETCR     FETCH FOLLOWING
C070 03606 060065      LDA .10       CHARACTER
C071 03607 027614R      JMP VAR02
C072 03610 062047R  VAR01 LDA TEMP1    RETRIEVE LETTER,
C073 03611 066153R      LDB .47      SET 'NO DIGIT',

```

## CHECK SYNTAX AND TRANSLITERATE

|         |                       |         |                 |                                |
|---------|-----------------------|---------|-----------------|--------------------------------|
| C074    | 03612                 | 017660R | JSB STROP       | AND RECORD VARIABLE            |
| C075    | 03613                 | 062050R | LDA TEMP2       | RETRIEVE FOLLOWING CHARACTER   |
| C076    | 03614                 | 072050R | VAR02 STA TEMP2 | SAVE CHARACTER                 |
| C077    | 03615                 | 006400  | CLB             | INSIDE A                       |
| C078    | 03616                 | 056304R | CPB PFLAG       | DEF STATEMENT?                 |
| C079    | 03617                 | 127562R | JMP VAROP,I     | NO, EXIT VIA (P+3)             |
| C080    | 03620                 | 007400  | CCB             |                                |
| C081    | 03621                 | 046022R | ADB SBPTR       | RETRIEVE                       |
| C082    | 03622                 | 160001  | LDA 1,I         |                                |
| C083    | 03623                 | 012176R | AND MSK1        | OPERAND                        |
| C084    | 03624                 | 052304R | CFA PFLAG       | MATCH PARAMETER?               |
| C085    | 03625                 | 027630R | JMP VAR04       | YES                            |
| C086    | 03626                 | 062050R | VAR05 LDA TEMP2 | NO, RETRIEVE                   |
| C087    | 03627                 | 127562R | JMP VAROP,I     | CHARACTER AND EXIT VIA (P+3)   |
| C088    | 03630                 | 160001  | VAR04 LDA 1,I   | SET OPERAND TO                 |
| C089    | 03631                 | 032263R | IUR FLGBT       | ACTUAL PARAMETER               |
| C090    | 03632                 | 170001  | STA 1,I         | AND RECORD IT                  |
| C091    | 03633                 | 027626R | JMP VAR03       |                                |
| C092    | 03634                 | 062022R | VAR05 LDA SBPTR | SAVE                           |
| C093    | 03635                 | 073477R | STA ARYAD       | OPERAND ADDRESS                |
| C094    | 03636                 | 062047R | LDA TEMP1       | RETRIEVE LETTER                |
| C095    | 03637                 | 066152R | LDB .46         | RECORD                         |
| C096    | 03640                 | 017660R | JSB STROP       | ARRAY IDENTIFIER               |
| C097    | 03641                 | 062170R | LDA B133        | RETRIEVE LEFT BRACKET          |
| C098    | 03642                 | 017407R | JSB SBSCK       | FETCH SUBSCRIPT                |
| C099    | 03643                 | 000000  | NOP             |                                |
| C100    | 03644                 | 127562R | JMP VAROP,I     | EXIT VIA (P+2)                 |
| C101**  |                       |         |                 |                                |
| C102*** | FETCH A LETTER        |         |                 | **                             |
| C103**  |                       |         |                 |                                |
| C104    | 03645                 | 000000  | LTR NOP         |                                |
| C105    | 03646                 | 017377R | JSB GETCR       |                                |
| C106    | 03647                 | 060065  | LDA .10         |                                |
| C107    | 03650                 | 017366R | JSB LETCK       | LETTER?                        |
| C108    | 03651                 | 127645R | JMP LTR,I       | NO, EXIT VIA (P+1)             |
| C109    | 03652                 | 037645R | ISZ LTR         | YES,                           |
| C110    | 03653                 | 072047R | STA TEMP1       | SAVE IT                        |
| C111    | 03654                 | 017377R | JSB GETCR       | NEXT CHARACTER                 |
| C112    | 03655                 | 060065  | LDA .10         | TO (A)                         |
| C113    | 03656                 | 072050R | STA TEMP2       | SAVE SECOND CHARACTER          |
| C114    | 03657                 | 127645R | JMP LTR,I       | EXIT VIA (P+2)                 |
| C115**  |                       |         |                 |                                |
| C116*** | STORE AN OPERAND NAME |         |                 | **                             |
| C117**  |                       |         |                 |                                |
| C118    | 03660                 | 000000  | STROP NOP       | LETTER IN (A), NUMBER IN (B)   |
| C119    | 03661                 | 049077  | ADA D100        | NUMERICALLY ADJUST THE         |
| C120    | 03662                 | 046241R | ADB D53         | OPERAND NAME                   |
| C121    | 03663                 | 001723  | ALF,RAR ::      |                                |
| C122    | 03664                 | 030001  | IUR 1           | TWO PARTS                      |
| C123    | 03665                 | 132022R | IUR SBPTR,I     | COMPLETE OPERAND-OPERATOR PAIR |
| C124    | 03666                 | 172022R | STA SBPTR,I     | AND STORE IT                   |
| C125    | 03667                 | 036022R | ISZ SBPTR       | UPDATE S-BUFFER POINTER        |
| C126    | 03670                 | 127660R | JMP STROP,I     |                                |



## CHECK SYNTAX AND TRANSLITERATE

C128\*\*

C129\*\*\* CHECK FOR LEFT PARENTHESIS \*\*

C130\*\*

|      |       |         |      |             |                  |
|------|-------|---------|------|-------------|------------------|
| C131 | 03671 | 000000  | LPCK | NOP         | CHARACTER IN (A) |
| C132 | 03672 | 064051  |      | LDB M2      | LEFT PARENTHESIS |
| C133 | 03673 | 017066R |      | JSB SYMCK   | OR               |
| C134 | 03674 | 002270R |      | DEF LBRAC-1 | LEFT BRACKET?    |
| C135 | 03675 | 027205R |      | JMP FSCE1   | NO               |
| C136 | 03676 | 062207R |      | LDA B1140   | ::               |
| C137 | 03677 | 172022R |      | STA SBPTR,I | LEFT PARENTHESIS |
| C138 | 03700 | 127671R |      | JMP LPCK,I  | EXIT             |

C139\*\*

C140\*\*\* CHECK FOR RIGHT PARENTHESIS \*\*

C141\*\*

|      |       |         |      |             |                              |
|------|-------|---------|------|-------------|------------------------------|
| C142 | 03701 | 000000  | RPCK | NOP         |                              |
| C143 | 03702 | 064051  |      | LDB M2      | RIGHT PARENTHESIS            |
| C144 | 03703 | 017066R |      | JSB SYMCK   | OR                           |
| C145 | 03704 | 002234R |      | DEF RPARN-1 | RIGHT BRACKET?               |
| C146 | 03705 | 027261R |      | JMP FSCE2   | NO                           |
| C147 | 03706 | 062202R |      | LDA B2000   | YES, RECORD A                |
| C148 | 03707 | 172022R |      | STA SBPTR,I | RIGHT PARENTHESIS            |
| C149 | 03710 | 035022R |      | ISZ SBPTR   | UPDATE SYNTAX BUFFER POINTER |
| C150 | 03711 | 017377R |      | JSB GETCH   | FETCH                        |
| C151 | 03712 | 060065  |      | LDA .10     | FOLLOWING CHARACTER          |
| C152 | 03713 | 127701R |      | JMP RPCK,I  |                              |

C153\*\*

C154\*\*\* FETCH MAT STATEMENT SUBSCRIPT \*\*

C155\*\*

|      |       |         |       |             |                         |
|------|-------|---------|-------|-------------|-------------------------|
| C156 | 03714 | 000000  | MATSB | NOP         |                         |
| C157 | 03715 | 064051  |       | LDB M2      | LEFT PARENTHESIS        |
| C158 | 03716 | 017066R |       | JSB SYMCK   | OR                      |
| C159 | 03717 | 002270R |       | DEF LBRAC-1 | LEFT BRACKET?           |
| C160 | 03720 | 127714R |       | JMP MATSB,I | NO                      |
| C161 | 03721 | 037714R |       | ISZ MATSB   | YES, SET RETURN ADDRESS |
| C162 | 03722 | 062206R |       | LDA B1100   | RECORD A                |
| C163 | 03723 | 172022R |       | STA SBPTR,I | LEFT BRACKET            |
| C164 | 03724 | 017120R |       | JSB FSC     | FETCH SUBSCRIPT         |
| C165 | 03725 | 007400  |       | CCB         |                         |
| C166 | 03726 | 017066R |       | JSB SYMCK   | COMMA?                  |
| C167 | 03727 | 002230R |       | DEF COMMA-1 |                         |
| C168 | 03730 | 002001  |       | RSS         | NO                      |
| C169 | 03731 | 017120R |       | JSB FSC     | YES, FETCH SUBSCRIPT    |
| C170 | 03732 | 064051  |       | LDB M2      | RIGHT PARENTHESIS       |
| C171 | 03733 | 017066R |       | JSB SYMCK   | OR                      |
| C172 | 03734 | 002234R |       | DEF RPARN-1 | RIGHT BRACKET           |
| C173 | 03735 | 027261R |       | JMP FSCE2   |                         |
| C174 | 03736 | 062203R |       | LDA B2400   | ::                      |
| C175 | 03737 | 172022R |       | STA SBPTR,I | RIGHT BRACKET           |
| C176 | 03740 | 035022R |       | ISZ SBPTR   |                         |
| C177 | 03741 | 017377R |       | JSB GETCH   | END-OF-STATEMENT?       |
| C178 | 03742 | 025476R |       | JMP ACIST   | YES                     |
| C179 | 03743 | 127714R |       | JMP MATSB,I |                         |

## CHECK SYNTAX AND TRANSLITERATE

C181\*\*

C182\*\*\* FETCH PARENTHESIZED FORMULA \*\*

C183\*\*

|      |       |         |       |         |                        |
|------|-------|---------|-------|---------|------------------------|
| C184 | 03744 | 000000  | GETPF | NOP     |                        |
| C185 | 03745 | 017377R | JSB   | GETCR   |                        |
| C186 | 03746 | 026070R | JMP   | EOF     |                        |
| C187 | 03747 | 036022R | ISZ   | SBPTR   |                        |
| C188 | 03750 | 017671R | JSB   | LPCK    | FETCH LEFT PARENTHESIS |
| C189 | 03751 | 017120R | JSB   | FSC     | FETCH FORMULA          |
| C190 | 03752 | 017701R | JSB   | RPCK    | GET RIGHT PARENTHESIS  |
| C191 | 03753 | 127744R | JMP   | GETPF,I |                        |

C192\*\*

C193\*\*\* FLAG OPERATOR WHICH PRECEDES NUMBER \*\*

C194\*\*

|      |       |         |       |         |                  |
|------|-------|---------|-------|---------|------------------|
| C195 | 03754 | 000000  | NUMOP | NOP     |                  |
| C196 | 03755 | 072052R | STA   | TEMP4   |                  |
| C197 | 03756 | 064050  | LDB   | M3      | FETCH            |
| C198 | 03757 | 046022R | ADB   | SBPTR   | PRECEDING        |
| C199 | 03760 | 160001  | LDA   | 1,I     | OPERATOR         |
| C200 | 03761 | 032263R | IOR   | FLGBT   | ADD FLAG BIT     |
| C201 | 03762 | 170001  | STA   | 1,I     | REPLACE OPERATOR |
| C202 | 03763 | 062052R | LDA   | TEMP4   |                  |
| C203 | 03764 | 127754R | JMP   | NUMOP,I |                  |

## CHECK SYNTAX AND TRANSLITERATE

```

0205*
0206*   SYSTEM COMMAND TABLE
0207*
0208  03765 000003 SYCMD OCT 00003
0209  03766 051125      ASC 2,RUN      EXECUTE PROGRAM
        03767 047040
0210*
0211  03770 001003      OCT 1003  ::
0212  03771 051503      ASC 2,SCR      SCRATCH PROGRAM
        03772 051040
0213*
0214  03773 001404      OCT 1404  ::
0215  03774 045111      ASC 2,LIST     LIST COMMAND
        03775 051524
0216*
0217  03776 002405      OCT 2405  ::
0218  03777 050114      ASC 3,PLIST    PUNCH LIST COMMAND
        04000 044523
        04001 052040
0219*
0220  04002 005003      OCT 5003  ::
0221  04003 050124      ASC 2,PTA
        04004 040440
0222*
0223  04005 033004      OCT 33004
0224  04006 051524 SYCMD ASC 2,STOP    ABORT CURRENT ACTIVITY
        04007 047520
0225*
0226  04010 023003      OCT 23003 ::
0227  04011 052101      ASC 2,TAP      ACTIVATE TTY TAPE MODE
        04012 050040
0228*
0229  04013 024003      OCT 24003 ::
0230  04014 041131      ASC 2,BYE      EXIT SYSTEM
        04015 042440
0231  04016 025005      OCT 25005 ::
0232  04017 050125      ASC 3,PUNCH
        04020 047103
        04021 044040
0233  04022 027404      OCT 27404
0234  04023 045117      ASC 2,LOAD ::
        04024 040504
0235*****
0236**
0237*** PRINT NAME TABLE FOR OPERATORS **
0238**
0239  04025 015003 LET   OCT 15003 ::
0240  04026 045105      ASC 2,LET
        04027 052040
0241  04030 015403 DIM   OCT 15403 ::
0242  04031 042111      ASC 2,DIM
        04032 045440
0243  04033 015003 COM   OCT 16003 ::
0244  04034 041517      ASC 2,COM
        04035 045440

```

## CHECK SYNTAX AND TRANSLITERATE

```
C245 04036 015403 DEF OCT 16403 ::
C246 04037 042105 ASC 2,DEF
      04040 043040
C247 04041 017003 REM OCT 17003 ::
C248 04042 051105 ASC 2,REM
      04043 046440
C249 04044 017404 GOTO OCT 17404 ::
C250 04045 043517 ASC 2,GOTO
      04046 052117
C251 04047 020002 IF OCT 20002 ::
C252 04050 044506 ASC 1,IF
C253 04051 020403 FOR OCT 20403 ::
C254 04052 043117 ASC 2,FOR
      04053 051040
C255 04054 021004 NEXT OCT 21004 ::
C256 04055 047105 ASC 2,NEXT
      04056 054124
C257 04057 021405 GOSUB OCT 21405 ::
C258 04060 043517 ASC 3,GOSUB
      04061 051525
      04062 041040
C259 04063 022006 RTN OCT 22006 ::
C260 04064 051105 ASC 3,RETURN
      04065 052125
      04066 051116
C261 04067 022403 END OCT 22403 ::
C262 04070 042516 ASC 2,END
      04071 042040
C263 04072 023004 STP OCT 23004 ::
C264 04073 051524 ASC 2,STOP
      04074 047520
C265 04075 023404 WAIT OCT 23404 ::
C266 04076 053501 ASC 2,WAIT
      04077 044524
C267 04100 024004 CALL OCT 24004 ::
C268 04101 041501 ASC 2,CALL
      04102 046114
C269 04103 024404 DATA OCT 24404 ::
C270 04104 042101 ASC 2,DATA
      04105 052101
C271 04106 025004 READ OCT 25004 ::
C272 04107 051105 ASC 2,READ
      04110 040504
C273 04111 025405 PRINT OCT 25405 ::
C274 04112 050122 ASC 3,PRINT
      04113 044516
      04114 052040
C275 04115 025005 INPUT OCT 26005 ::
C276 04116 044516 ASC 3,INPUT
      04117 050125
      04120 052040
C277 04121 026407 RSTOR OCT 26407 ::
C278 04122 051105 ASC 4,RESTORE
      04123 051524
      04124 047522
```

## CHECK SYNTAX AND TRANSLITERATE

|       |       |        |       |              |
|-------|-------|--------|-------|--------------|
|       | 04125 | 042440 |       |              |
| C279  | 04126 | 027003 | MAT   | OCT 27003 :: |
| C280  | 04127 | 046501 |       | ASC 2,MAT    |
|       | 04130 | 052040 |       |              |
| C281  | 04131 | 027404 | THEN  | OCT 27404    |
| C282  | 04132 | 052110 |       | ASC 2,THEN   |
|       | 04133 | 042516 |       |              |
| C283  | 04134 | 030002 | TO    | OCT 30002 :: |
| C284  | 04135 | 052117 |       | ASC 1,TO     |
| C285  | 04136 | 030404 | STEP  | OCT 30404 :: |
| C286  | 04137 | 051524 |       | ASC 2,STEP   |
|       | 04140 | 042520 |       |              |
| C287  | 04141 | 013403 | NOT   | OCT 13403    |
| C288  | 04142 | 047117 |       | ASC 2,NOT    |
|       | 04143 | 052040 |       |              |
| C289  | 04144 | 013003 | AND   | OCT 13003    |
| C290  | 04145 | 040516 |       | ASC 2,AND    |
|       | 04146 | 042040 |       |              |
| C291  | 04147 | 012402 | OR    | OCT 12402    |
| C292  | 04150 | 047522 |       | ASC 1,OR     |
| C293  | 04151 | 014002 | GTE   | OCT 14002 :: |
| C294  | 04152 | 037075 |       | ASC 1,>=     |
| C295  | 04153 | 014402 | LTE   | OCT 14402 :: |
| C296  | 04154 | 035075 |       | ASC 1,<=     |
| C297  | 04155 | 074002 | AUNEQ | OCT 74002 :: |
| C298  | 04156 | 035076 |       | ASC 1,<>     |
| C299* |       |        |       |              |
| C300  | 04157 | 000403 | TAB   | OCT 403 ::   |
| C301  | 04160 | 052101 |       | ASC 2,TAB    |
|       | 04161 | 041040 |       |              |
| C302  | 04162 | 001003 | SIN   | OCT 1003 ::  |
| C303  | 04163 | 051511 |       | ASC 2,SIN    |
|       | 04164 | 047040 |       |              |
| C304  | 04165 | 001403 | COS   | OCT 1403     |
| C305  | 04166 | 041517 |       | ASC 2,COS    |
|       | 04167 | 051440 |       |              |
| C306  | 04170 | 002003 | TAN   | OCT 2003 ::  |
| C307  | 04171 | 052101 |       | ASC 2,TAN    |
|       | 04172 | 047040 |       |              |
| C308  | 04173 | 002403 | ATN   | OCT 2403 ::  |
| C309  | 04174 | 040524 |       | ASC 2,ATN    |
|       | 04175 | 047040 |       |              |
| C310  | 04176 | 003003 | EXPN  | OCT 3003 ::  |
| C311  | 04177 | 042530 |       | ASC 2,EXP    |
|       | 04200 | 050040 |       |              |
| C312  | 04201 | 003403 | LOG   | OCT 3403 ::  |
| C313  | 04202 | 046117 |       | ASC 2,LOG    |
|       | 04203 | 043440 |       |              |
| C314  | 04204 | 004003 | ABS   | OCT 4003 ::  |
| C315  | 04205 | 040502 |       | ASC 2,ABS    |
|       | 04206 | 051440 |       |              |
| C316  | 04207 | 004403 | SQR   | OCT 4403 ::  |
| C317  | 04210 | 051521 |       | ASC 2,SQR    |
|       | 04211 | 051040 |       |              |
| C318  | 04212 | 005003 | INT   | OCT 5003 ::  |

## CHECK SYNTAX AND TRANSLITERATE

|                                                    |       |         |                  |                            |
|----------------------------------------------------|-------|---------|------------------|----------------------------|
| C319                                               | 04213 | 044516  | ASC 2,INT        |                            |
|                                                    | 04214 | 052040  |                  |                            |
| C320                                               | 04215 | 005403  | RND OCT 5403 ::  |                            |
| C321                                               | 04216 | 051116  | ASC 2,RND        |                            |
|                                                    | 04217 | 042040  |                  |                            |
| C322                                               | 04220 | 006003  | SGN OCT 6003 ::  |                            |
| C323                                               | 04221 | 051507  | ASC 2,SGN        |                            |
|                                                    | 04222 | 047040  |                  |                            |
| C324                                               | 04223 | 006403  | ZER OCT 6403 ::  |                            |
| C325                                               | 04224 | 055105  | ASC 2,ZER        |                            |
|                                                    | 04225 | 051040  |                  |                            |
| C326                                               | 04226 | 007003  | CON OCT 7003 ::  |                            |
| C327                                               | 04227 | 041517  | ASC 2,CON        |                            |
|                                                    | 04230 | 047040  |                  |                            |
| C328                                               | 04231 | 007403  | IDN OCT 7403 ::  |                            |
| C329                                               | 04232 | 044504  | ASC 2,IDN        |                            |
|                                                    | 04233 | 047040  |                  |                            |
| C330                                               | 04234 | 010003  | INV OCT 10003 :: |                            |
| C331                                               | 04235 | 044516  | ASC 2,INV        |                            |
|                                                    | 04236 | 053040  |                  |                            |
| C332                                               | 04237 | 010403  | TRN OCT 10403 :: |                            |
| C333                                               | 04240 | 052122  | ASC 2,TRN        |                            |
|                                                    | 04241 | 047040  |                  |                            |
| C334**                                             |       |         |                  |                            |
| C335*** TABLE SEARCH FOR MULTICHARACTER SYMBOLS ** |       |         |                  |                            |
| C336**                                             |       |         |                  |                            |
| C337                                               | 04242 | 000000  | TBSRH NOP        |                            |
| C338                                               | 04243 | 072362R | STA TABLE        | STORE TABLE ADDRESS        |
| C339                                               | 04244 | 075055R | STB LENGH        | STORE -(NUMBER OF ENTRIES) |
| C340                                               | 04245 | 062017R | LDA BAADDR       | SAVE                       |
| C341                                               | 04246 | 072051R | STA TEMP3        | INPUT                      |
| C342                                               | 04247 | 062020R | LDA CCNT         | BUFFER                     |
| C343                                               | 04250 | 072052R | STA TEMP4        | STATUS                     |
| C344                                               | 04251 | 062022R | LDA SBPTR        | INITIALIZE END-OF-SYMBOL   |
| C345                                               | 04252 | 072400R | STA SMEND        | POINTER                    |
| C346                                               | 04253 | 002404  | CLA,INA          | COUNT FIRST CHARACTER OF   |
| C347                                               | 04254 | 072626R | STA SLENG        | SYMBOL                     |
| C348                                               | 04255 | 162022R | LDA SBPTR,I      | FETCH PARTIAL SYMBOL       |
| C349                                               | 04256 | 010073  | AND B177         | TWO                        |
| C350                                               | 04257 | 152022R | CPA SBPTR,1      | CHARACTERS?                |
| C351                                               | 04260 | 002001  | RSS              | NO                         |
| C352                                               | 04261 | 025304R | JMP TSR10        | YES                        |
| C353                                               | 04262 | 001727  | ALF,ALF          | LEFT-JUSTIFY               |
| C354                                               | 04263 | 032141R | IOR .32          | FIRST CHARACTER AND        |
| C355                                               | 04264 | 172022R | STA SBPTR,I      | APPEND BLANK               |
| C356                                               | 04265 | 017377R | TSRC1 JSB GETCR  | FETCH NEXT CHARACTER       |
| C357                                               | 04266 | 025355R | JMP TSRC9        | END-OF-STATEMENT           |
| C358                                               | 04267 | 065626R | LDB SLENG        | CHECK FOR                  |
| C359                                               | 04270 | 054065  | CPB .10          | IMPOSSIBLE LENGTH          |
| C360                                               | 04271 | 025355R | JMP TSRC9        |                            |
| C361                                               | 04272 | 004010  | SLB              | EVEN-NUMBERED CHARACTER?   |
| C362                                               | 04273 | 025301R | JMP TSRC2        | YES                        |
| C363                                               | 04274 | 035400R | ISZ SMEND        | NO, FETCH FRESH WORD,      |
| C364                                               | 04275 | 001727  | ALF,ALF          | LEFT-JUSTIFY CHARACTER,    |
| C365                                               | 04276 | 032141R | IOR .32          | APPEND BLANK,              |

## CHECK SYNTAX AND TRANSLITERATE

|                                            |       |         |                   |                           |
|--------------------------------------------|-------|---------|-------------------|---------------------------|
| 0366                                       | 04277 | 172400R | STA SMEND,I       | AND STORE                 |
| 0367                                       | 04300 | 026304R | JMP TSR10         |                           |
| 0368                                       | 04301 | 042240R | TSRC2 ADA M32     | DELETE BLANK,             |
| 0369                                       | 04302 | 142400R | ADA SMEND,I       | FILL SECOND CHARACTER,    |
| 0370                                       | 04303 | 172400R | STA SMEND,I       | AND STORE                 |
| 0371                                       | 04304 | 036626R | TSR10 ISZ SLENG   | COUNT IT                  |
| 0372                                       | 04305 | 066055R | LDB LNGTH         | INITIALIZE TABLE LENGTH   |
| 0373                                       | 04306 | 076053R | STB COUNT         | COUNTER                   |
| 0374                                       | 04307 | 062362R | LDA TABLE         |                           |
| 0375                                       | 04310 | 072553R | TSRC3 STA TBLPT   | SET TABLE POINTER         |
| 0376                                       | 04311 | 162553R | LDA TBLPT,I       | EXTRACT SYMBOL LENGTH     |
| 0377                                       | 04312 | 010070  | AND .15           | FROM TABLE AND COMPARE    |
| 0378                                       | 04313 | 052626R | CPA SLENG         | WITH CURRENT SYMBOL       |
| 0379                                       | 04314 | 026323R | JMP TSRC5         | EQUAL?                    |
| 0380                                       | 04315 | 040056  | TSRC4 ADA .3      | DIFFERENT,                |
| 0381                                       | 04316 | 001100  | AKS               | UPDATE                    |
| 0382                                       | 04317 | 042553R | ADA TBLPT         | TABLE POINTER             |
| 0383                                       | 04320 | 036053R | ISZ COUNT         | MORE ENTRIES?             |
| 0384                                       | 04321 | 026310R | JMP TSRC3         | YES                       |
| 0385                                       | 04322 | 026265R | JMP TSRC1         | NO                        |
| 0386                                       | 04323 | 066553R | TSRC5 LDB TBLPT   | SET POINTER TO            |
| 0387                                       | 04324 | 076603R | STB TSPTR         | TABLE SYMBOL              |
| 0388                                       | 04325 | 066022R | LDB SBPTR         | SET (B) TO INPUT          |
| 0389                                       | 04326 | 026332R | JMP TSRC7         | SYMBOL POINTER            |
| 0390                                       | 04327 | 056400R | TSRC6 CPB SMEND   | ALL OF SYMBOL CONSIDERED? |
| 0391                                       | 04330 | 026340R | JMP TSRC8         | YES, MATCH OCCURRED       |
| 0392                                       | 04331 | 006004  | INB               | NO, INCREMENT             |
| 0393                                       | 04332 | 036603R | TSRC7 ISZ TSPTR   | SYMBOL POINTERS           |
| 0394                                       | 04333 | 162603R | LDA TSPTR,I       | FETCH WORD FROM TABLE     |
| 0395                                       | 04334 | 150001  | CPA 1,1           | MATCH WITH INPUT SYMBOL?  |
| 0396                                       | 04335 | 026327R | JMP TSRC6         | YES                       |
| 0397                                       | 04336 | 062626R | LDA SLENG         | NO, WRONG                 |
| 0398                                       | 04337 | 026315R | JMP TSRC4         | SYMBOL                    |
| 0399                                       | 04340 | 162553R | TSRC8 LDA TBLPT,I | EXTRACT                   |
| 0400                                       | 04341 | 012220R | AND OPMSK         | SYMBOL CODE               |
| 0401                                       | 04342 | 172022R | STA SBPTR,I       |                           |
| 0402                                       | 04343 | 162553R | LDA TBLPT,I       |                           |
| 0403                                       | 04344 | 001727  | ALF,ALF           |                           |
| 0404                                       | 04345 | 001222  | RAL,RAL ::        |                           |
| 0405                                       | 04346 | 001200  | RAL ::            |                           |
| 0406                                       | 04347 | 010062  | AND .7            |                           |
| 0407                                       | 04350 | 003000  | CMA               |                           |
| 0408                                       | 04351 | 072272R | STA PARM          |                           |
| 0409                                       | 04352 | 162022R | LDA SBPTR,I       |                           |
| 0410                                       | 04353 | 036242R | ISZ TBSRH         | AND RETURN VIA            |
| 0411                                       | 04354 | 126242R | JMP TBSRH,I       | 'SUCCESS' EXIT            |
| 0412                                       | 04355 | 062051R | TSRC9 LDA TEMP3   | RESTORE                   |
| 0413                                       | 04356 | 072017R | STA BADDR         | INPUT                     |
| 0414                                       | 04357 | 062052R | LDA TEMP4         | BUFFER                    |
| 0415                                       | 04360 | 072020R | STA CCNT          | STATUS                    |
| 0416                                       | 04361 | 126242R | JMP TBSRH,I       | 'FAILURE' EXIT            |
| 0417**                                     |       |         |                   |                           |
| 0418*** FECH AND RECORD PROGRAM INTEGER ** |       |         |                   |                           |
| 0419**                                     |       |         |                   |                           |
| 0420                                       | 04362 | 000000  | PRGIN NOP         |                           |

## CHECK SYNTAX AND TRANSLITERATE

|                                     |       |         |                 |                             |  |
|-------------------------------------|-------|---------|-----------------|-----------------------------|--|
| C421                                | 04363 | 162022R | LDA SBPTR,I     | SET                         |  |
| C422                                | 04364 | 032263R | IOR FLGBT       | 'INTEGER                    |  |
| C423                                | 04365 | 040056  | ADA .3          | FOLLOWS'                    |  |
| C424                                | 04366 | 172022R | STA SBPTR,I     | OPERAND                     |  |
| C425                                | 04367 | 162362R | LDA PRGIN,I     | GIVE ADDRESS                |  |
| C426                                | 04370 | 072375R | STA PRG11       | TO INTCK                    |  |
| C427                                | 04371 | 036022R | ISZ SBPTR       |                             |  |
| C428                                | 04372 | 017377R | JSB GETCR       |                             |  |
| C429                                | 04373 | 016274R | SYE25 JSB ERROR |                             |  |
| C430                                | 04374 | 016400R | JSB INTCK       | FETCH                       |  |
| C431                                | 04375 | 000000  | PRG11 NOP       |                             |  |
| C432                                | 04376 | 036362R | ISZ PRGIN       |                             |  |
| C433                                | 04377 | 126362R | JMP PRGIN,I     |                             |  |
| C434**                              |       |         |                 |                             |  |
| C435*** BUILD AN INTEGER **         |       |         |                 |                             |  |
| C436**                              |       |         |                 |                             |  |
| C437                                | 04400 | 000000  | INTCK NOP       | CHARACTER IN (A)            |  |
| C438                                | 04401 | 006400  | CLB             | STORE                       |  |
| C439                                | 04402 | 076626R | STB INTGR       | PARTIAL RESULT              |  |
| C440                                | 04403 | 017353R | INTC1 JSB DIGCK | DIGIT?                      |  |
| C441                                | 04404 | 026422R | JMP INTC2       | NO                          |  |
| C442                                | 04405 | 103101  | CLC             |                             |  |
| C443                                | 04406 | 065626R | LDB INTGR       | MULTIPLY                    |  |
| C444                                | 04407 | 044001  | ADB 1           | PARTIAL                     |  |
| C445                                | 04410 | 044001  | ADB 1           | RESULT                      |  |
| C446                                | 04411 | 046626R | ADB INTGR       | BY                          |  |
| C447                                | 04412 | 044001  | ADB 1           | 10                          |  |
| C448                                | 04413 | 044000  | ADB 0           | ADD LATEST DIGIT            |  |
| C449                                | 04414 | 102201  | SOC             | OVERFLOW?                   |  |
| C450                                | 04415 | 026373R | JMP SYE25       | YES                         |  |
| C451                                | 04416 | 075626R | STB INTGR       | STORE PARTIAL RESULT        |  |
| C452                                | 04417 | 017377R | JSB GETCR       | NO, FETCH                   |  |
| C453                                | 04420 | 060065  | LDA .10         | NEXT CHARACTER              |  |
| C454                                | 04421 | 026403R | JMP INTC1       |                             |  |
| C455                                | 04422 | 066626R | INTC2 LDB INTGR | ZERO                        |  |
| C456                                | 04423 | 005003  | SZB,RSS         | INTEGER?                    |  |
| C457                                | 04424 | 026373R | JMP SYE25       | YES                         |  |
| C458                                | 04425 | 176022R | STB SBPTR,I     | NO, RECORD IT               |  |
| C459                                | 04426 | 165400R | LDB INTCK,I     | INTEGER                     |  |
| C460                                | 04427 | 164001  | LDB 1,I         | TOO                         |  |
| C461                                | 04430 | 046626R | ADB INTGR       | LARGE?                      |  |
| C462                                | 04431 | 005021  | SSB,RSS         |                             |  |
| C463                                | 04432 | 026373R | JMP SYE25       | YES                         |  |
| C464                                | 04433 | 066626R | LDB INTGR       | NO,                         |  |
| C465                                | 04434 | 036022R | ISZ SBPTR       | RETURN WITH                 |  |
| C466                                | 04435 | 036400R | ISZ INTCK       | INTEGER                     |  |
| C467                                | 04436 | 126400R | JMP INTCK,I     | IN (B)                      |  |
| C468**                              |       |         |                 |                             |  |
| C469*** PROCESS CHARACTER STRING ** |       |         |                 |                             |  |
| C470**                              |       |         |                 |                             |  |
| C471                                | 04437 | 000000  | CHRST NOP       |                             |  |
| C472                                | 04440 | 072050R | STA TEMP2       | RECORD TERMINATOR CHARACTER |  |
| C473                                | 04441 | 060065  | LDA .10         | DUMMY                       |  |
| C474                                | 04442 | 072271R | STA BLANK       | DELETE CHARACTER            |  |
| C475                                | 04443 | 017377R | CHRS1 JSB GETCR |                             |  |



## CHECK SYNTAX AND TRANSLITERATE

|      |       |         |                 |                          |
|------|-------|---------|-----------------|--------------------------|
| 0476 | 04444 | 025462R | JMP CHRS3       | TO END-OF-STATEMENT EXIT |
| 0477 | 04445 | 052050R | CPA TEMP2       | TERMINATOR CHARACTER?    |
| 0478 | 04446 | 025461R | JMP CHRS2       | YES                      |
| 0479 | 04447 | 132022R | IOR SBPTR,I     | NO, FILL                 |
| 0480 | 04450 | 172022R | STA SBPTR,I     | SECOND CHARACTER         |
| 0481 | 04451 | 017377R | JSB GETCR       |                          |
| 0482 | 04452 | 025462R | JMP CHRS3       | TO END-OF-STATEMENT EXIT |
| 0483 | 04453 | 052050R | CPA TEMP2       | TERMINATOR CHARACTER?    |
| 0484 | 04454 | 025461R | JMP CHRS2       | YES                      |
| 0485 | 04455 | 035022R | ISZ SBPTR       | NO, MOVE TO NEW WORD     |
| 0486 | 04456 | 001727  | ALF,ALF         | AND STORE                |
| 0487 | 04457 | 172022R | STA SBPTR,I     | FIRST CHARACTER          |
| 0488 | 04460 | 025443R | JMP CHRS1       |                          |
| 0489 | 04461 | 036437R | CHRS2 ISZ CHRST | SET (P+2) EXIT           |
| 0490 | 04462 | 035022R | CHRS3 ISZ SBPTR | MUVE TO NEXT BUFFER WORD |
| 0491 | 04463 | 062141R | LDA .32         | RESTORE BLANK AS         |
| 0492 | 04464 | 072271R | STA BLANK       | DELETE CHARACTER         |
| 0493 | 04465 | 125437R | JMP CHRST,I     |                          |

## CHECK SYNTAX AND TRANSLITERATE

```

C495**
C496***  DELETE STATEMENT  **
C497**
C498  04466 162021R DLSTM LDA SBUFA,I  LOAD SEQUENCE NUMBER
C499  04467 015553R      JSB FNDPS    FIND STATEMENT TO BE DELETED
C500  04470 027611R      JMP PEXMK     DOESN'T
C501  04471 027611R      JMP PEXMK     EXIST
C502  04472 002400      CLA            ZERO WORD SKIP FOR .DESTINATION
C503  04473 005004      INB            ADDRESS OF SOURCE WORD SKIP IN B
C504  04474 015603R      JSB CLPRG     CLOSE UP PROGRAM
C505  04475 027611R      JMP PEXMK     EXIT TO PHASE 1 WAIT
C506*
C507***                                     ***
C508**  ACCEPT STATEMENT  **
C509***                                     ***
C510*
C511  04476 062021R ACTSI LDA SBUFA    COMPUTE
C512  04477 003004      CMA,INA        LENGTH
C513  04500 042022R      ADA SBPTR      OF STATEMENT
C514  04501 172046R      STA TEMP,I    AND RECORD IT
C515  04502 065010C      LDB PBPTR     PICK UP STATEMENT ADDR.
C516  04503 075051R      STB TEMP3     AND SAVE
C517  04504 162021R      LDA SBUFA,I   LOAD SEQUENCE NUMBER
C518  04505 003004      CMA,INA        MAKE SEQ # NEGATIVE
C519  04506 042015R      ADA ULDLN     ADD PREVIOUS SEQ #
C520  04507 002020      SSA            P-SEQ < S-SEQ ?
C521  04510 025531R      JMP ACCS1     YES, APPEND STATEMENT TO PROG.
C522  04511 162021R      LDA SBUFA,I   NO, CONTINUE CHECKING
C523  04512 015553R      JSB FNDPS     SEARCH ON SEQUENCE NUMBER
C524  04513 025531R      JMP ACCS1     APPEND STATEMENT TO PROGRAM
C525  04514 025547R      JMP ACCS4     INSERT STATEMENT IN PROGRAM
C526  04515 005004      INB            REPLACE STATEMENT IN PROGRAM
C527  04516 060001      LDA 1
C528  04517 017204R      JSB DREAD    COMPARE LENGTHS OF
C529  04520 003004      CMA,INA        STATEMENT BEING REPLACED
C530  04521 142046R      ADA TEMP,I    AND STATEMENT
C531  04522 002003      SZA,RSS       REPLACING IT
C532  04523 025533R      JMP ACCS2     EQUAL
C533  04524 002021      SSA,RSS
C534  04525 025550R      JMP ACCS4+1   SHORTER
C535  04526 162046R      LDA TEMP,I    LONGER,
C536  04527 015603R      JSB CLPRG     CLOSE UP PROGRAM
C537  04530 025533R      JMP ACCS2
C538  04531 162046R ACCS1 LDA TEMP,I   LOAD PROGRAM SPACE REQUIREMENT
C539  04532 015626R      JSB UVCHK     SUFFICIENT PROGRAM SPACE LEFT?
C540  04533 005400 ACCS2 CLB            YES, SET COUNTER TO ZERO
C541  04534 062021R      LDA SBUFA     INITIALIZE
C542  04535 072050R      STA TEMP2     SOURCE ADDRESS
C543  04536 162050R ACCS3 LDA TEMP2,1  TRANSFER WORD FROM
C544  04537 017151R      JSB DSTOR     S-BUFFER TO PROGRAM SPACE
C545  04540 000051R      DEF TEMP3
C546  04541 035050R      ISZ TEMP2     INCREMENT SOURCE AND
C547  04542 035051R      ISZ TEMP3     .DESTINATION ADDRESSES
C548  04543 005004      INB            BUMP COUNTER
C549  04544 155046R      CPB TEMP,I    ENTIRE STATEMENT MOVED?

```

CHECK SYNTAX AND TRANSLITERATE

|       |       |         |                  |                                |
|-------|-------|---------|------------------|--------------------------------|
| C550  | 04545 | 027611R | JMP PEXMK        | YES                            |
| C551  | 04546 | 026536R | JMP ACCS3        | NO                             |
| ✓C552 | 04547 | 162046R | ACCS4 LDA TEMP,I | LOAD PROGRAM SPACE REQUIREMENT |
| C553  | 04550 | 016626R | JSB OVCHK        | SUFFICIENT PROGRAM SPACE LEFT? |
| C554  | 04551 | 016353R | JSB MVTUH        | MAKE                           |
| C555  | 04552 | 026533R | JMP ACCS2        | ROOM                           |

## CHECK SYNTAX AND TRANSLITERATE

C557\*\*

C558\*\*\* FIND SEQUENTIAL POSITION \*\*

C559\*\*

|      |       |         |       |              |                           |
|------|-------|---------|-------|--------------|---------------------------|
| C560 | 04553 | 000000  | FNDPS | NOP          |                           |
| C561 | 04554 | 072051R |       | STA TEMP3    | SAVE SEQUENCE NUMBER      |
| C562 | 04555 | 065007C |       | LDB PBUFF    | STARTING ADDRESS          |
| C563 | 04556 | 055010C | FNDP1 | CPB PBPTR    | END OF PROGRAM?           |
| C564 | 04557 | 025601R |       | JMP FNDP4    | YES, EXIT VIA (P+1)       |
| C565 | 04560 | 060001  |       | LDA 1        |                           |
| C566 | 04561 | 017204R |       | JSB DREAD    | SUBTRACT PROGRAM          |
| C567 | 04562 | 003004  |       | CMA, INA     | SEQUENCE NUMBER FROM      |
| C568 | 04563 | 042051R |       | ADA TEMP3    | S-BUFFER SEQUENCE NUMBER  |
| C569 | 04564 | 002003  |       | SZA, RSS     | EQUAL?                    |
| C570 | 04565 | 025577R |       | JMP FNDP2    | YES, SET EXIT TO (P+3)    |
| C571 | 04566 | 002020  |       | SSA          | NO, P-SEQ NO > S-SEQ NO ? |
| C572 | 04567 | 025600R |       | JMP FNDP3    | YES, SET EXIT TO (P+2)    |
| C573 | 04570 | 060001  |       | LDA 1        | POINT (A) TO              |
| C574 | 04571 | 002004  |       | INA          | PROGRAM ADDRESS INCREMENT |
| C575 | 04572 | 073130R |       | STA IMP2     |                           |
| C576 | 04573 | 017204R |       | JSB DREAD    |                           |
| C577 | 04574 | 044000  |       | ADB 0        | COMPUTE NEW ADDRESS       |
| C578 | 04575 | 063130R |       | LDA IMP2     |                           |
| C579 | 04576 | 025556R |       | JMP FNDP1    |                           |
| C580 | 04577 | 036553R | FNDP2 | ISZ FNDPS    |                           |
| C581 | 04600 | 036553R | FNDP3 | ISZ FNDPS    |                           |
| C582 | 04601 | 075051R | FNDP4 | STB TEMP3    | SAVE STATEMENT ADDRESS    |
| C583 | 04602 | 125553R |       | JMP FNDPS, 1 |                           |

C584\*\*

C585\*\*\* DELETE SPACE IN PROGRAM \*\*

C586\*\*

|      |       |         |       |              |                                |
|------|-------|---------|-------|--------------|--------------------------------|
| C587 | 04603 | 000000  | CLPR6 | NOP          | REFERENCE LOCATION IN TEMP3    |
| C588 | 04604 | 042051R |       | ADA TEMP3    | SKIP (A) LOCATIONS FROM TEMP3  |
| C589 | 04605 | 072052R |       | STA TEMP4    | AND SAVE .DESTINATION ADDRESS  |
| C590 | 04606 | 060001  |       | LDA 1        |                                |
| C591 | 04607 | 017204R |       | JSB DREAD    | SKIP TO END OF STATEMENT BEING |
| C592 | 04610 | 070001  |       | STA 1        |                                |
| C593 | 04611 | 045051R |       | ADB TEMP3    | DELETED, SOURCE ADDRESS IN (B) |
| C594 | 04612 | 055010C | CLPR1 | CPB PBPTR    | ALL OF PROGRAM MOVED?          |
| C595 | 04613 | 025623R |       | JMP CLPR2    | YES                            |
| C596 | 04614 | 060001  |       | LDA 1        |                                |
| C597 | 04615 | 017204R |       | JSB DREAD    | NO, MOVE WORD FROM SOURCE TO   |
| C598 | 04616 | 017151R |       | JSB DSTOR    | .DESTINATION ADDRESS           |
| C599 | 04617 | 000052R |       | DEF TEMP4    |                                |
| C600 | 04620 | 035052R |       | ISZ TEMP4    | INCREMENT .DESTINATION ADDRESS |
| C601 | 04621 | 005004  |       | INB          | INCREMENT SOURCE ADDRESS       |
| C602 | 04622 | 025612R |       | JMP CLPR1    |                                |
| C603 | 04623 | 062052R | CLPR2 | LDA TEMP4    | SET END-OF-PROGRAM             |
| C604 | 04624 | 072010C |       | STA PBPTR    | POINTER                        |
| C605 | 04625 | 125603R |       | JMP CLPR6, 1 |                                |

C606\*\*

C607\*\*\* CHECK FOR PROGRAM SPACE OVERFLOW \*\*

C608\*\*

|      |       |         |       |           |                             |
|------|-------|---------|-------|-----------|-----------------------------|
| C609 | 04626 | 000000  | OVCHK | NOP       | NEW WORD REQUIREMENT IN (A) |
| C610 | 04627 | 065010C |       | LDB PBPTR | SET SOURCE ADDRESS          |
| C611 | 04630 | 075050R |       | STB TEMP2 | FOR PROGRAM RELOCATION      |

## CHECK SYNTAX AND TRANSLITERATE

|      |       |         |             |                            |
|------|-------|---------|-------------|----------------------------|
| 0612 | 04631 | 103101  | CLO         |                            |
| 0613 | 04632 | 044000  | ADB 0       | SET .DESTINATION           |
| 0614 | 04633 | 076052R | STB TEMP4   | ADDRESS                    |
| 0615 | 04634 | 102201  | SOC         | ENOUGH FREE SPACE ?        |
| 0616 | 04635 | 027405R | JMP FSCE4   | NO, PROGRAM SPACE OVERFLOW |
| 0617 | 04636 | 066052R | LDB TEMP4   | YES, RELOCATE FREE         |
| 0618 | 04637 | 076010C | STB PBPTR   | PROGRAM SPACE POINTER      |
| 0619 | 04640 | 126626R | JMP OVCHK,I |                            |

```

C621*
C622* *****
C623***      ***
C624*** LIST THE PROGRAM ***
C625***      ***
C626* *****
C627*
C628 04641 062010C LIST LDA PBPTR #
C629 04642 072001R STA LWBM+1
C630 04643 072272R STA PARM
C631 04644 065007C LDB PBUFF INITIALIZE TO FIRST
C632 04645 075045R STB TEMPS STATEMENT OF PROGRAM
C633 04646 017577R JSB GETCR SEQUENCE NUMBER GIVEN?
C634 04647 025707R JMP LIST0 NO
C635 04650 065016R LDB .BUFA YES, SET FOR
C636 04651 075022R STB SBPTR SEQUENCE NUMBER
C637 04652 015400R JSB INTCK FETCH
C638 04653 000256R DEF MAXSN IT
C639 04654 072045R STA TEMPS
C640 04655 162016R LDA .BUFA,I LOAD SEQUENCE NUMBER
C641 04656 015553R JSB FNDPS FIND INITIAL STATEMENT
C642 04657 027575R JMP RDYPT
C643 04660 000000 NOP SAVE
C644 04661 062045R LDA TEMPS
C645 04662 075045R STB TEMPS
C646 04663 052151R CPA .44
C647 04664 017577R JSB GETCR
C648 04665 025707R JMP LIST0
C649 04666 065016R LDB .BUFA
C650 04667 075022R STB SBPTR
C651 04670 015400R JSB INTCK
C652 04671 000256R DEF MAXSN
C653 04672 162016R LDA .BUFA,I
C654 04673 015553R JSB FNDPS
C655 04674 025707R JMP LIST0
C656 04675 025707R JMP LIST0
C657 04676 060001 LDA 1
C658 04677 005004 INB
C659 04700 073130R STA TMP2
C660 04701 060001 LDA 1
C661 04702 017204R JSB DREAD
C662 04703 064000 LDB 0
C663 04704 063130R LDA TMP2
C664 04705 040001 ADA 1
C665 04706 072001R STA LWBM+1
C666 04707 005400 LIST0 CLB HIGH-SPEED
C667 04710 055023R CPB IFLAG PUNCH?
C668 04711 025714R JMP LIST1 NO
C669 04712 062170R LDA B133 YES, EMIT
C670 04713 117131R JSB LISTR,1 LEADER
C671 04714 065045R LIST1 LDB TEMPS MORE
C672 04715 055001R CPB LWBM+1
C673 04716 027117R JMP LIS13 NO
C674 04717 003400 CCA INITIALIZE
C675 04720 042021R ADA SBUFA OUTPUT BUFFER

```

|      |       |         |                 |                      |
|------|-------|---------|-----------------|----------------------|
| 0676 | 04721 | 072017R | STA BADDR       | POINTER              |
| 0677 | 04722 | 002400  | CLA             | INITIALIZE           |
| 0678 | 04723 | 072020R | STA CCNT        | CHARACTER COUNT      |
| 0679 | 04724 | 062045R | LDA TEMPS       |                      |
| 0680 | 04725 | 017204R | JSB DREAD       | OUTPUT               |
| 0681 | 04726 | 017132R | JSB OUTIN       | SEQUENCE NUMBER      |
| 0682 | 04727 | 062271R | LDA BLANK       | OUTPUT               |
| 0683 | 04730 | 017477R | JSB OUTCR       | BLANK                |
| 0684 | 04731 | 035045R | ISZ TEMPS       | FETCH                |
| 0685 | 04732 | 062045R | LDA TEMPS       |                      |
| 0686 | 04733 | 017204R | JSB DREAD       | STATEMENT LENGTH     |
| 0687 | 04734 | 003004  | CMA, INA        | SET                  |
| 0688 | 04735 | 002004  | INA             | WORD                 |
| 0689 | 04736 | 073234R | STA SLWST       | COUNTER              |
| 0690 | 04737 | 035045R | LIST3 ISZ TEMPS | MORE                 |
| 0691 | 04740 | 037234R | ISZ SLWST       | STATEMENT?           |
| 0692 | 04741 | 025752R | JMP LIST4       | YES                  |
| 0693 | 04742 | 065021R | LIST2 LDB SBUFA | OUTPUT               |
| 0694 | 04743 | 062020R | LDA CCNT        |                      |
| 0695 | 04744 | 117131R | JSB LISTR, I    | STATEMENT            |
| 0696 | 04745 | 102501  | LIA 01          | .                    |
| 0697 | 04746 | 012261R | AND HALF        |                      |
| 0698 | 04747 | 002002  | SZA             | IS SW #14 SET?       |
| 0699 | 04750 | 027575R | JMP RDYPT       | YES, RETURN TO READY |
| 0700 | 04751 | 025714R | JMP LIST1       |                      |
| 0701 | 04752 | 062045R | LIST4 LDA TEMPS |                      |
| 0702 | 04753 | 017204R | JSB DREAD       |                      |
| 0703 | 04754 | 012220R | AND OPMSK       |                      |
| 0704 | 04755 | 002003  | SZA, RSS        | NULL OPERATOR?       |
| 0705 | 04756 | 025776R | JMP LIST5       | YES                  |
| 0706 | 04757 | 072050R | STA TEMP2       | NO, SAVE OPERATOR    |
| 0707 | 04760 | 001727  | ALF, ALF        | SINGLE               |
| 0708 | 04761 | 064000  | LDB 0           | CHARACTER            |
| 0709 | 04762 | 042237R | ADA M21         |                      |
| 0710 | 04763 | 002021  | SSA, RSS        | OPERATOR?            |
| 0711 | 04764 | 027106R | JMP LIS12       | NO                   |
| 0712 | 04765 | 005000  | BLS             | YES                  |
| 0713 | 04766 | 005004  | INB             | LOAD                 |
| 0714 | 04767 | 045100R | ADB FDPBS       | SYMBOL'S             |
| 0715 | 04770 | 160001  | LDA 1, I        | ASCII WORD           |
| 0716 | 04771 | 001727  | ALF, ALF        | ADJUST               |
| 0717 | 04772 | 010074  | AND MSK0        | CHARACTER            |
| 0718 | 04773 | 052143R | CPA .34         | " ?                  |
| 0719 | 04774 | 027125R | JMP LIS14       | YES                  |
| 0720 | 04775 | 017477R | JSB OUTCR       | NO                   |
| 0721 | 04776 | 062045R | LIST5 LDA TEMPS |                      |
| 0722 | 04777 | 017204R | JSB DREAD       |                      |
| 0723 | 05000 | 012225R | AND OPMSK       | SAVE                 |
| 0724 | 05001 | 072051R | STA TEMP3       | OPERAND              |
| 0725 | 05002 | 012223R | AND TYPFL       | EXTRACT OPERAND TYPE |
| 0726 | 05003 | 072362R | STA LFLAG       | SET LFLAG FALSE      |
| 0727 | 05004 | 002020  | SSA             | FLAG BIT SET?        |
| 0728 | 05005 | 027041R | JMP LIST9       | YES                  |
| 0729 | 05006 | 002003  | SZA, RSS        | NO, NULL OPERAND?    |
| 0730 | 05007 | 025737R | JMP LIST3       | YES                  |

|      |       |         |            |                           |          |
|------|-------|---------|------------|---------------------------|----------|
| C731 | 05010 | 050062  | CPA .7     | FUNCTION                  |          |
| C732 | 05011 | 027034R | JMP LIST8  | YES                       |          |
| C733 | 05012 | 040046  | LIST6      | ADA M5                    |          |
| C734 | 05013 | 002020  | SSA        | LETTER-DIGIT COMBINATION? |          |
| C735 | 05014 | 027017R | JMP LIST7  | NO                        |          |
| C736 | 05015 | 003400  | CCA        | YES, SET                  |          |
| C737 | 05016 | 072362R | STA LFLAG  | LFLAG FALSE               |          |
| C738 | 05017 | 062051R | LIST7      | LDA TEMP3                 |          |
| C739 | 05020 | 001727  | ALF,ALF    | RESTORE AND               |          |
| C740 | 05021 | 001722  | ALF,RAL :: |                           |          |
| C741 | 05022 | 010073  | AND B177   | OUTPUT                    |          |
| C742 | 05023 | 042160R | ADA B100   |                           |          |
| C743 | 05024 | 017477R | JSB OUTCR  | LETTER                    |          |
| C744 | 05025 | 035362R | ISZ LFLAG  | DIGIT FOLLOWS?            |          |
| C745 | 05026 | 025737R | JMP LIST3  | NO                        |          |
| C746 | 05027 | 062051R | LDA TEMP3  | YES                       |          |
| C747 | 05030 | 010062  | AND .7     | RESTORE                   |          |
| C748 | 05031 | 042147R | ADA .43    | DIGIT                     |          |
| C749 | 05032 | 017477R | JSB OUTCR  | OUTPUT DIGIT              |          |
| C750 | 05033 | 025737R | JMP LIST3  |                           |          |
| C751 | 05034 | 062162R | LIST8      | LDA F                     | OUTPUT   |
| C752 | 05035 | 017477R | JSB OUTCR  | 'F'                       |          |
| C753 | 05036 | 062166R | LDA N      | OUTPUT                    |          |
| C754 | 05037 | 017477R | JSB OUTCR  | 'N'                       |          |
| C755 | 05040 | 027017R | JMP LIST7  |                           |          |
| C756 | 05041 | 022263R | LIST9      | XOR FLGBT                 |          |
| C757 | 05042 | 002102  | CLE,SZA    | NUMBER?                   |          |
| C758 | 05043 | 027064R | JMP LIS10  | NO                        |          |
| C759 | 05044 | 035045R | ISZ TEMPS  | YES                       |          |
| C760 | 05045 | 072041R | STA SIGN   | SET SIGN FLAG FALSE       |          |
| C761 | 05046 | 062045R | LDA TEMPS  |                           |          |
| C762 | 05047 | 017204R | JSB DREAD  |                           |          |
| C763 | 05050 | 035045R | ISZ TEMPS  |                           |          |
| C764 | 05051 | 073130R | STA TMP2   |                           |          |
| C765 | 05052 | 062045R | LDA TEMPS  |                           |          |
| C766 | 05053 | 017204R | JSB DREAD  |                           |          |
| C001 | 05054 | 064000  | LDB 0      |                           |          |
| C002 | 05055 | 063130R | LDA TMP2   |                           |          |
| C003 | 05056 | 037234R | ISZ SLWST  |                           |          |
| C004 | 05057 | 037234R | ISZ SLWST  |                           |          |
| C005 | 05060 | 002120  | CLE,SSA    | NEGATIVE NUMBER?          |          |
| C006 | 05061 | 002300  | CCE        | YES, SET SIGN FLAG TRUE   |          |
| C007 | 05062 | 015041R | JSB NUMOT  |                           |          |
| C008 | 05063 | 025737R | JMP LIST3  |                           |          |
| C009 | 05064 | 050056  | LIS10      | CPA .3                    | INTEGER? |
| C010 | 05065 | 027100R | JMP LIS11  | YES                       |          |
| C011 | 05066 | 050062  | CPA .7     | NO,FUNCTION               |          |
| C012 | 05067 | 002001  | RSS        | YES                       |          |
| C013 | 05070 | 027012R | JMP LIST6  | NO, MUST BE A PARAMETER   |          |
| C014 | 05071 | 062051R | LDA TEMP3  | COMPUTE                   |          |
| C015 | 05072 | 001722  | ALF,RAL    | PRINT                     |          |
| C016 | 05073 | 012220R | AND OPMSK  | TABLE                     |          |
| C017 | 05074 | 072050R | STA TEMP2  | CODE                      |          |
| C018 | 05075 | 066122R | LDB ATAB   | OUTPUT                    |          |
| C019 | 05076 | 017216R | JSB MCOUT  | FUNCTION NAME             |          |



|        |                   |         |                   |                               |
|--------|-------------------|---------|-------------------|-------------------------------|
| C020   | 05077             | 025737R | JMP LIST3         |                               |
| C021   | 05100             | 036045R | LIS11 ISZ TEMPS   | OUTPUT                        |
| C022   | 05101             | 037234R | ISZ SLWST         |                               |
| C023   | 05102             | 062045R | LDA TEMPS         |                               |
| C024   | 05103             | 017204R | JSB DREAD         | INTEGER                       |
| C025   | 05104             | 017132R | JSB OUTIN         |                               |
| C026   | 05105             | 025737R | JMP LIST3         | OPERAND                       |
| C027   | 05106             | 062271R | LIS12 LDA BLANK   | OUTPUT                        |
| C028   | 05107             | 017477R | JSB OUTCR         | BLANK                         |
| C029   | 05110             | 066106R | LDB STIYP         | OUTPUT                        |
| C030   | 05111             | 017216R | JSB MCOUT         | OPERATOR                      |
| C031   | 05112             | 062212R | LDA REMOP         | WAS IT                        |
| C032   | 05113             | 052050R | CPA TEMP2         | A REM?                        |
| C033   | 05114             | 027173R | JMP OUTS1         | YES, OUTPUT REMARK            |
| C034   | 05115             | 062271R | LDA BLANK         | NO, OUTPUT                    |
| C035   | 05116             | 025775R | JMP LIST5-1       | A BLANK                       |
| C036   | 05117             | 006400  | LIS13 CLB         | HIGH-SPEED                    |
| C037   | 05120             | 036023R | CPB TFLAG         | PUNCH?                        |
| C038   | 05121             | 027575R | JMP RDYPT         | NO                            |
| C039   | 05122             | 062170R | LDA B133          | YES, EMIT                     |
| C040   | 05123             | 117131R | JSB LISTR,1       | TRAILER                       |
| C041   | 05124             | 027575R | JMP RDYPT         |                               |
| C042   | 05125             | 017477R | LIS14 JSB OUTCR   | OUTPUT "                      |
| C043   | 05126             | 017172R | JSB OUTST         | OUTPUT QUOTE STRING           |
| C044   | 05127             | 062143R | LDA .34           | OUTPUT                        |
| C045   | 05130             | 025775R | JMP LIST5-1       |                               |
| C046   | 05131             | 000000  | LISTR NOP         |                               |
| C047*  |                   |         | *                 |                               |
| C048** | OUTPUT AN INTEGER |         | **                |                               |
| C049*  |                   |         | *                 |                               |
| C050   | 05132             | 000000  | OUTIN NOP         | INTEGER IN (A)                |
| C051   | 05133             | 064047  | LDB M4            | SET                           |
| C052   | 05134             | 077701R | STB DIGCT         | DIGIT COUNTER                 |
| C053   | 05135             | 067251R | LDB LDVSR         | SET DIVISOR                   |
| C054   | 05136             | 076400R | STB DIVSR         | ADDRESS                       |
| C055   | 05137             | 006400  | CLB               | SET LEADING                   |
| C056   | 05140             | 076626R | SIB LDZRO         | ZERO FLAG                     |
| C057   | 05141             | 166400R | OUTI1 LDB DIVSR,1 | NEGATE                        |
| C058   | 05142             | 007004  | CMB,INB           | AND STORE                     |
| C059   | 05143             | 076553R | STB MIND          | DIVISOR                       |
| C060   | 05144             | 007400  | CCB               | SET QUOTIENT                  |
| C061   | 05145             | 006004  | INB               | TO ZERO                       |
| C062   | 05146             | 042553R | ADA MIND          | SUBTRACT DIVISOR FROM INTEGER |
| C063   | 05147             | 002021  | SSA,RSS           | NEGATIVE RESULT?              |
| C064   | 05150             | 027145R | JMP *-3           | NO, INCREMENT QUOTIENT        |
| C065   | 05151             | 142400R | ADA DIVSR,1       | YES, RECOVER REMAINDER        |
| C066   | 05152             | 073216R | STA MCOUT         | AND SAVE IT                   |
| C067   | 05153             | 060001  | LDA 1             |                               |
| C068   | 05154             | 002002  | SZA               | ZERO?                         |
| C069   | 05155             | 027160R | JMP OUTI2         | NO                            |
| C070   | 05156             | 052626R | CPA LDZRO         | YES, LEADING ZERO?            |
| C071   | 05157             | 027163R | JMP OUTI3         | YES                           |
| C072   | 05160             | 042154R | OUTI2 ADA .48     | NO, COMPUTE ASCII FOR DIGIT   |
| C073   | 05161             | 072626R | STA LDZRO         | SET 'ZEROES SIGNIFICANT'      |
| C074   | 05162             | 017477R | JSB OUTCR         | OUTPUT DIGIT                  |

|        |                              |         |       |         |         |                               |
|--------|------------------------------|---------|-------|---------|---------|-------------------------------|
| C075   | 05163                        | 063216R | OUT13 | LDA     | MCOUT   | RETRIEVE REMAINDER            |
| C076   | 05164                        | 066400R |       | ISZ     | DIVSR   | SET FOR NEXT DIVISOR          |
| C077   | 05165                        | 067701R |       | ISZ     | DIGCT   | DIVISION NECESSARY?           |
| C078   | 05166                        | 027141R |       | JMP     | OUT11   | YES                           |
| C079   | 05167                        | 042154R |       | ADA     | .48     | NO, COMPUTE ASCII FOR LAST    |
| C080   | 05170                        | 017477R |       | JSB     | OUTCR   | DIGIT AND OUTPUT IT           |
| C081   | 05171                        | 127132R |       | JMP     | OUTIN,1 |                               |
| C082*  |                              |         |       | *       |         |                               |
| C083** | OUTPUT A STRING              |         | **    |         |         |                               |
| C084*  |                              |         |       | *       |         |                               |
| C085   | 05172                        | 000000  | OUTST | NOP     |         | " ENTRY POINT                 |
| C086   | 05173                        | 062045R | OUTS1 | LDA     | TEMPS   | REM ENTRY POINT               |
| C087   | 05174                        | 017204R |       | JSB     | DREAD   |                               |
| C088   | 05175                        | 010073  |       | AND     | B177    | OUTPUT SECOND CHARACTER       |
| C089   | 05176                        | 002002  |       | SZA     |         | OF WORD IF                    |
| C090   | 05177                        | 017477R |       | JSB     | OUTCR   | NOT NULL                      |
| C091   | 05200                        | 066045R |       | ISZ     | TEMPS   | BUMP POINTER                  |
| C092   | 05201                        | 037234R |       | ISZ     | SLWST   | REM COMPLETED?                |
| C093   | 05202                        | 002001  |       | RSS     |         | NO                            |
| C094   | 05203                        | 026742R |       | JMP     | LIST2   | YES                           |
| C095   | 05204                        | 062045R |       | LDA     | TEMPS   |                               |
| C096   | 05205                        | 017204R |       | JSB     | DREAD   | EXTRACT                       |
| C097   | 05206                        | 001727  |       | ALF,ALF |         | FIRST CHARACTER               |
| C098   | 05207                        | 010073  |       | AND     | B177    | OF WORD                       |
| C099   | 05210                        | 050054  |       | CPA     | .1      | EXIT                          |
| C100   | 05211                        | 127172R |       | JMP     | OUTST,1 | IF A                          |
| C101   | 05212                        | 052245R |       | CPA     | STCON   | CLOSING                       |
| C102   | 05213                        | 127172R |       | JMP     | OUTST,1 | QUOTE                         |
| C103   | 05214                        | 017477R |       | JSB     | OUTCR   | OUTPUT                        |
| C104   | 05215                        | 027173R |       | JMP     | OUTS1   | CHARACTER                     |
| C105*  |                              |         |       | *       |         |                               |
| C106** | LIST A MULTICHARACTER SYMBOL |         | **    |         |         |                               |
| C107*  |                              |         |       | *       |         |                               |
| C108   | 05216                        | 000000  | MCOUT | NOP     |         |                               |
| C109   | 05217                        | 160001  | MCOU1 | LDA     | 1,1     | LOAD INFORMATION WORD         |
| C110   | 05220                        | 012220R |       | AND     | OPMSK   | COMPARE WITH                  |
| C111   | 05221                        | 052050R |       | CPA     | TEMP2   | OPERATOR CODE                 |
| C112   | 05222                        | 027231R |       | JMP     | MCOU2   | EQUAL                         |
| C113   | 05223                        | 160001  |       | LDA     | 1,1     | UNEQUAL,                      |
| C114   | 05224                        | 010070  |       | AND     | .15     | COMPUTE                       |
| C115   | 05225                        | 040056  |       | ADA     | .3      | ENTRY                         |
| C116   | 05226                        | 001100  |       | ARS     |         | LENGTH                        |
| C117   | 05227                        | 044000  |       | ADB     | 0       | COMPUTE ADDRESS OF NEXT ENTRY |
| C118   | 05230                        | 027217R |       | JMP     | MCOU1   |                               |
| C119   | 05231                        | 160001  | MCOU2 | LDA     | 1,1     | COMPUTE                       |
| C120   | 05232                        | 010070  |       | AND     | .15     | ENTRY                         |
| C121   | 05233                        | 003004  |       | CMA,INA |         | LENGTH                        |
| C122   | 05234                        | 073701R |       | STA     | DIGCT   | AND SAVE IT                   |
| C123   | 05235                        | 006104  |       | CLE,INB |         | SET FOR FIRST CHARACTER       |
| C124   | 05236                        | 076051R |       | STB     | TEMP3   | SAVE SYMBOL ADDRESS           |
| C125   | 05237                        | 162051R | MCOU3 | LDA     | TEMP3,1 | LOAD WORD                     |
| C126   | 05240                        | 002041  |       | SEZ,RSS |         | FIRST CHARACTER?              |
| C127   | 05241                        | 001727  |       | ALF,ALF |         | YES, POSITION IT              |
| C128   | 05242                        | 010073  |       | AND     | B177    | EXTRACT CHARACTER             |
| C129   | 05243                        | 017477R |       | JSB     | OUTCR   | OUTPUT IT                     |

|       |       |         |                   |                             |
|-------|-------|---------|-------------------|-----------------------------|
| C130  | 05244 | 002240  | SEZ,CME           | SET FOR NEXT CHARACTER      |
| C131  | 05245 | 036051R | ISZ TEMP3         | MOVE TO NEXT WORD OF SYMBOL |
| C132  | 05246 | 037701R | ISZ DIGCT         | MORE CHARACTERS?            |
| C133  | 05247 | 027237R | JMP MC003         | YES                         |
| C134  | 05250 | 127216R | JMP MCOUT,1       |                             |
| C135* |       |         |                   |                             |
| C136* |       |         |                   |                             |
| C137  | 05251 | 005252R | LDVSR DEF *+1     |                             |
| C138  | 05252 | 023420  | DEC 10000         |                             |
| C139  | 05253 | 001750  | DEC 1000          |                             |
| C140  | 05254 | 000144  | DEC 100           |                             |
| C141  | 05255 | 000012  | DEC 10            |                             |
| C142* |       |         |                   |                             |
| C143* |       |         |                   |                             |
| C144  | 03534 |         | SFLAG EQU ARRY5   |                             |
| C145  | 04362 |         | TABLE EQU PRGIN   |                             |
| C146  | 00055 |         | LNGTH EQU TEMPS+8 |                             |
| C147  | 04400 |         | SMEND EQU INTCK   |                             |
| C148  | 04626 |         | SLENG EQU OVCHK   |                             |
| C149  | 04553 |         | TBLPT EQU FNDPS   |                             |
| C150  | 04603 |         | TSPTK EQU CLPRG   |                             |
| C151  | 04626 |         | INTGR EQU OVCHK   |                             |
| C152  | 04362 |         | LFLAG EQU PRGIN   |                             |
| C153  | 04400 |         | DIVSR EQU INTCK   |                             |
| C154  | 04626 |         | LDZRO EQU OVCHK   |                             |
| C155  | 04553 |         | MIND EQU FNDPS    |                             |

```

C157*          *****
C158*          PHASE 2 OF THE COMPILER
C159*          *****
C160*
C161*          THIS PHASE HAS THE FOLLOWING 3 FUNCTIONS:
C162*          1. SYMBOL TABLE CONSTRUCTION
C163*          2. FOR LOOP CHECKING
C164*          3. ARRAY STORAGE ALLOCATION
C165*
C166 05256 062010C MFASE LDA PBPTR      NULL
C167 05257 072007R      STA FDISK      ADDR. OF START OF ARRAY STORAGE
C168 05260 052007C      CPA PBUFF      PROGRAM?
C169 05261 027575R      JMP RDYPT      YES
C170 05262 062013R      LDA ASBTB
C171 05263 072006R      STA FCORE      NO, SET FOR-TABLE POINTER
C172 05264 062002R      LDA FWAM
C173 05265 072056R      STA COML      INITIALIZE COMMON POINTER
C174 05266 062011R      LDA SYMTA
C175 05267 072010R      STA SYMTF      INITIALIZE SYMBOL TABLE POINTER
C176 05270 062007C      LDA PBUFF
C177 05271 072022R      STA MPTR      INITIALIZE PROGRAM POINTER
C178 05272 062022R MLOP1 LDA MPTR
C179 05273 017204R      JSB DREAD
C180 05274 064000      LDB A
C181 05275 075033R      STB .LNUM      SET LINE NUMBER
C182 05276 065022R      LDB MPTR
C183 05277 035022R      ISZ MPTR
C184 05300 062022R      LDA MPTR
C185 05301 017204R      JSB DREAD
C186 05302 044000      ADB A      COMPUTE LOCATION OF NEXT
C187 05303 077266R      STB MNPTR      STATEMENT AND STORE THIS
C188 05304 035022R      ISZ MPTR
C189 05305 062022R      LDA MPTR
C190 05306 017204R      JSB DREAD      FETCH THE FIRST WORD IN THE
C191 05307 001727 MLO10 ALF,ALF      STATEMENT AND ITS TYPE
C192 05310 010075      AND B177      :::
C193 05311 072034R      STA TYPE
C194 05312 052152R      CPA .46      MAT STATEMENT?
C195 05313 027325R      JMP MLO12      YES
C196 05314 052140R      CPA .30      NO, REM STATEMENT?
C197 05315 075022R      STB MPTR      YES, SET TO SKIP IT
C198 05316 052156R      CPA .50      WRITE STATEMENT?
C199 05317 027321R      JMP *+2      YES, SET TO SKIP IT
C200 05320 052147R      CPA .43      NO, PRINT STATEMENT?
C201 05321 075022R      STB MPTR      YES, SET TO SKIP IT
C202 05322 003400      CCA      NO, SET
C203 05323 072057R      STA MWDND      'FIRST VARIABLE'
C204 05324 027341R      JMP MLOP2+1      FLAG
C205*
C206 05325 062022R MLO12 LDA MPTR      SEEK
C207 05326 002004      INA      SUBSIDIARY
C208 05327 017204R      JSB DREAD      STATEMENT
C209 05330 027307R      JMP MLO10      TYPE
C210*
C211 05331 012176R MLO13 AND MSK1      YES, ISOLATE OPERAND

```

|       |       |         |                |                                 |
|-------|-------|---------|----------------|---------------------------------|
| 0212  | 05332 | 066022R | LDB MPTR       | INDEX THE PROGRAM POINTER BY    |
| 0213  | 05333 | 002003  | SZA, RSS       | AN AMOUNT APPROPRIATE TO THE    |
| 0214  | 05334 | 044055  | ADB .2         | OPERAND. THE FOLLOWING APPLIES  |
| 0215  | 05335 | 050056  | CPA .3         | OPERAND = 0 ADD 2 TO POINTER    |
| 0216  | 05336 | 006004  | INB            | OPERAND =3 ADD 1 TO POINTER     |
| 0217  | 05337 | 076022R | STB MPTR       |                                 |
| 0218* |       |         |                |                                 |
| 0219  | 05340 | 036022R | MLOP2 ISZ MPTR | INCREMENT WORD-OF-STATEMENT PTR |
| 0220  | 05341 | 062022R | LDA MPTR       | STATEMENT                       |
| 0221  | 05342 | 053266R | CPA MNPTR      | EXHAUSTED?                      |
| 0222  | 05343 | 027433R | JMP MLOP5      | YES                             |
| 0223  | 05344 | 062022R | LDA MPTR       |                                 |
| 0224  | 05345 | 017204R | JSB DREAD      | GET STATEMENT TYPE              |
| 0225  | 05346 | 012220R | AND UPMSK      |                                 |
| 0226  | 05347 | 052215R | CPA PRNOP      | PRINT?                          |
| 0227  | 05350 | 027431R | JMP MLO14      | YES, SKIP TO NEXT STATEMENT     |
| 0228  | 05351 | 052214R | CPA WRUP       | WRITE?                          |
| 0229  | 05352 | 027431R | JMP MLO14      | YES, SKIP TO NEXT STATEMENT     |
| 0230  | 05353 | 062022R | LDA MPTR       | NO                              |
| 0231  | 05354 | 017204R | JSB DREAD      |                                 |
| 0232  | 05355 | 002020  | SSA            | 'CONSTANT' OPERAND?             |
| 0233  | 05356 | 027331R | JMP MLO13      | YES                             |
| 0234  | 05357 | 012176R | AND MSK1       | NO                              |
| 0235  | 05360 | 002003  | SZA, RSS       | NULL OPERAND?                   |
| 0236  | 05361 | 027340R | JMP MLOP2      | YES                             |
| 0237  | 05362 | 072045R | STA MBOX1      | NO, SAVE IT                     |
| 0238  | 05363 | 010062  | AND .7         | PROGRAMMER-DEFINED              |
| 0239  | 05364 | 050062  | CPA .7         | FUNCTION?                       |
| 0240  | 05365 | 027442R | JMP MLOP6      | YES                             |
| 0241  | 05366 | 040047  | ADA M4         | NO                              |
| 0242  | 05367 | 002020  | SSA            | ARRAY VARIABLE?                 |
| 0243  | 05370 | 027463R | JMP MLOP7      | YES                             |
| 0244  | 05371 | 062045R | LDA MBOX1      | NO, SIMPLE VARIABLE             |
| 0245  | 05372 | 017613R | JSB SSYMT      | ALREADY IN                      |
| 0246  | 05373 | 006021  | SSB, RSS       | SYMBOL TABLE?                   |
| 0247  | 05374 | 027403R | JMP MLOP3      | YES                             |
| 0248  | 05375 | 062263R | LDA MNEG       | NO                              |
| 0249  | 05376 | 066264R | LDB MNEG+1     | ENTER                           |
| 0250  | 05377 | 072046R | STA MBOX1+1    | IT WITH                         |
| 0251  | 05400 | 076047R | STB MBOX1+2    | 'UNDEFINED'                     |
| 0252  | 05401 | 060050  | LDA M3         | VALUE                           |
| 0253  | 05402 | 017660R | JSB ESYMT      |                                 |
| 0254  | 05403 | 066034R | MLOP3 LDB TYPE |                                 |
| 0255  | 05404 | 062045R | LDA MBOX1      |                                 |
| 0256  | 05405 | 055143R | CPB .34        | NEXT STATEMENT?                 |
| 0257  | 05406 | 027420R | JMP MLOP4      | YES                             |
| 0258  | 05407 | 055142R | CPB .33        | NO, FOR STATEMENT?              |
| 0259  | 05410 | 036057R | ISZ MWONU      | YES, FIRST VARIABLE?            |
| 0260  | 05411 | 027340R | JMP MLOP2      | NO                              |
| 0261  | 05412 | 036006R | ISZ FCORE      | DEMAND                          |
| 0262  | 05413 | 066006R | LDB FCORE      | SPACE                           |
| 0263  | 05414 | 055010R | CPB SYMTF      | FOR NEW                         |
| 0264  | 05415 | 027670R | JMP MER8-1     | ENTRY                           |
| 0265  | 05416 | 172006R | STA FCORE,1    | SAVE VARIABLE NAME              |
| 0266  | 05417 | 027340R | JMP MLOP2      |                                 |

|       |       |         |       |             |                                 |
|-------|-------|---------|-------|-------------|---------------------------------|
| C267* |       |         |       |             |                                 |
| C268  | 05420 | 065006R | MLOP4 | LDB FCORE   | FOR-TABLE                       |
| C269  | 05421 | 055013R |       | CPB ASBTB   | EMPTY?                          |
| C270  | 05422 | 016274R |       | JSB ERROR   | YES                             |
| C271  | 05423 | 152006R | MER3  | CPA FCORE,I | NO, MATCH LATEST ENTRY?         |
| C272  | 05424 | 002001  |       | RSS         | YES                             |
| C273  | 05425 | 027422R |       | JMP MER3-1  | NO                              |
| C274  | 05426 | 044052  |       | ADB M1      | REMOVE                          |
| C275  | 05427 | 075006R |       | STB FCORE   | MATCHED                         |
| C276  | 05430 | 027340R |       | JMP MLOP2   | ENTRY                           |
| C277* |       |         |       |             |                                 |
| C278  | 05431 | 063266R | MLU14 | LDA MNPTR   |                                 |
| C279  | 05432 | 072022R |       | STA MPTR    |                                 |
| C280  | 05433 | 052010C | MLOP5 | CPA PBPTR   | PROGRAM EXHAUSTED?              |
| C281  | 05434 | 002001  |       | RSS         | YES                             |
| C282  | 05435 | 027272R |       | JMP MLOP1   | NO                              |
| C283  | 05436 | 062034R |       | LDA TYPE    | YES                             |
| C284  | 05437 | 052144R |       | CPA .37     | END STATEMENT?                  |
| C285  | 05440 | 027561R |       | JMP M1LOP   | YES                             |
| C286  | 05441 | 016274R |       | JSB ERROR   | NO                              |
| C287  | 05442 | 062022R | MLOP6 | LDA MPTR    | ISOLATE                         |
| C288  | 05443 | 017204R |       | JSB DREAD   |                                 |
| C289  | 05444 | 012220R |       | AND OPMSK   | PRECEDING OPERATOR              |
| C290  | 05445 | 052211R |       | CPA DEFOP   | 'DEF' ?                         |
| C291  | 05446 | 002001  |       | RSS         | YES                             |
| C292  | 05447 | 027340R |       | JMP MLOP2   | NO GO TO PROCESS NEXT WORD      |
| C293  | 05450 | 062045R |       | LDA MBOX1   | SEARCH SYMBOL TABLE FOR         |
| C294  | 05451 | 017613R |       | JSB SSYMT   | THE FUNCTION                    |
| C295  | 05452 | 006021  |       | SSB,RSS     |                                 |
| C296  | 05453 | 016274R |       | JSB ERROR   | FOUND. ERROR MULTIPLY DEFINED   |
| C297  | 05454 | 062022R | MER4  | LDA MPTR    |                                 |
| C298  | 05455 | 040056  |       | ADA .3      | ENTER THE FUNCTION INTO THE     |
| C299  | 05456 | 032263R |       | IOR FLGHT   | ADD V.A. FLAG                   |
| C300  | 05457 | 072046R |       | STA MBOX1+1 | SYMBOL TABLE TOGETHER WITH      |
| C301  | 05460 | 060051  |       | LDA M2      | ITS ENTRY POINT IN THE SOURCE   |
| C302  | 05461 | 017660R |       | JSB ESYMT   | CODE                            |
| C303  | 05462 | 027340R |       | JMP MLOP2   | GO TO PROCESS THE NEXT WORD     |
| C304* |       |         |       |             |                                 |
| C305  | 05463 | 070001  | MLOP7 | STA 1       |                                 |
| C306  | 05464 | 062034R |       | LDA TYPE    |                                 |
| C307  | 05465 | 052136R |       | CPA .27     | DIM STATEMENT?                  |
| C308  | 05466 | 027500R |       | JMP MLOP8   | YES                             |
| C309  | 05467 | 052137R |       | CPA .28     | NO, COM STATEMENT?              |
| C310  | 05470 | 027500R |       | JMP MLOP8   | YES                             |
| C311  | 05471 | 017701R |       | JSB MSYMT   | NO, LOOK FOR IT IN SYMBOL TABLE |
| C312  | 05472 | 027340R |       | JMP MLOP2   | FOUND                           |
| C313  | 05473 | 002400  |       | CLA         | NOT THERE                       |
| C314  | 05474 | 072046R |       | STA MBOX1+1 | ENTER IT WITH                   |
| C315  | 05475 | 072047R |       | STA MBOX1+2 | DIMENSIONS AND                  |
| C316  | 05476 | 072050R |       | STA MBOX1+3 | DIMENSIONALITY                  |
| C317  | 05477 | 027542R |       | JMP MLOP0   | UNDEFINED                       |
| C318* |       |         |       |             |                                 |
| C319  | 05500 | 035022R | MLOP8 | ISZ MPTR    | PROCESS COM OR DIM STMT         |
| C320  | 05501 | 035022R |       | ISZ MPTR    |                                 |
| C321  | 05502 | 062022R |       | LDA MPTR    | PICK UP FIRST DIMENSION         |

## PRE-EXECUTION PROCESSING

```

0322 05503 017204R JSB DREAD
0323 05504 001727 ALF,ALF SHIFT TO M. S. PART OF WORD
0324 05505 054050 CPB M3 IS THIS A SINGLE DIMENSION ARRAY
0325 05506 027516R JMP *+8 YES, JUMP
0326 05507 036022R ISZ MPTR NO, INDEX POINTER TO THE LOC.
0327 05510 036022R ISZ MPTR OF SECOND DIMENSION AND PACK
0328 05511 073130R STA TMP2 INTO A WITH
0329 05512 062022R LDA MPTR
0330 05513 017204R JSB DREAD
0331 05514 033130R IOR TMP2 THE FIRST DIMENSION
0332 05515 002001 RSS
0333 05516 030054 IOR .1
0334 05517 072047R STA MBOX1+2 SET UP TO STORE PACKED
0335 05520 072050R STA MBOX1+3 DIMENSIONS IN FORMAL AND ACTUAL
0336 05521 002400 CLA SLOTS AND UNDEFINED FLAG IN
0337 05522 072046R STA MBOX1+1 STORAGE ALLOCATION SLOT
0338 05523 017701R JSB MSYMT IN SYMBOL TABLE?
0339 05524 027545R JMP MLOP9 NO
0340 05525 062034R LDA TYPE YES
0341 05526 052137R CPA .28
0342 05527 002001 RSS IS STMT A COM
0343 05530 027542R JMP MLOP0 NO, JUMP
0344 05531 062047R LDA MBOX1+2 YES PICK UP PACKED DIMENSIONS
0345 05532 017130R JSB MDIM COMPUTE STORAGE REQUIRED
0346 05533 064000 LDB A
0347 05534 062056R LDA COML POINTER TO NEXT FREE LOC IN COM
0348 05535 032263R IOR FLGHT ADD V.A. FLAG
0349 05536 072046R STA MBOX1+1 STORE IN STORAGE ALLOCATION SLOT
0350 05537 012222R AND INF
0351 05540 040001 ADA B
0352 05541 072056R STA COML UPDATE PTR BY AMT OF STORAGE REQ.
0353 05542 060047 MLOP0 LDA M4 ENTER THE FOUR WORD ENTRY
0354 05543 017660R JSB ESYMT PREVIOUSLY SET UP IN MBOX1 INTO
0355 05544 027340R JMP MLOP2 SYMBOL TABLE AND CONTINUE
0356*
0357 05545 044055 MLOP9 ADB .2 CHECK THE FORMAL DIMENSIONS
0358 05546 160001 LDA 1,1 LOCATION TO SEE IF THE DIMENSION
0359 05547 002002 SZA IS ALREADY DEFINED
0360 05550 016274R JSB ERROR ERROR, DOUBLY DIMENSIONED
0361 05551 062034R MERS LDA TYPE
0362 05552 052137R CPA .28 COM STMT?
0363 05553 025331R JMP SYNE3-1 ERROR MISPLACED COM. STMT.
0364 05554 062047R LDA MBOX1+2
0365 05555 170001 STA 1,1 STORE THESE DIMENSIONS IN FORMAL
0366 05556 006004 INB AND ACTUAL SLOTS IN SYMBOL TABLE
0367 05557 170001 STA 1,1 ENTRY
0368 05560 027340R JMP MLOP2 GO TO PROCESS NEXT WORD
0369*
0370* THE SECTION WHICH FOLLOWS CHECKS
0371* THAT ALL FOR LOOPS HAVE BEEN
0372* TERMINATED, ASSIGNS THE STANDARD
0373* DIMENSIONS TO UNDIMENSIONED ARRAYS
0374* AND MAKES STORAGE ASSIGNMENTS FOR
0375* ALL ARRAYS WHICH DO NOT APPEAR IN
0376* A COM STMT

```

|       |       |         |       |             |                            |
|-------|-------|---------|-------|-------------|----------------------------|
| C377* |       |         |       |             |                            |
| C378  | 05561 | 062006R | M1LOP | LDA FCORE   | ALL FORS                   |
| C379  | 05562 | 052013R |       | CPA ASBTB   | MATCHED?                   |
| C380  | 05563 | 002001  |       | RSS         | YES                        |
| C381  | 05564 | 015274R |       | JSB ERROR   | NO                         |
| C382  | 05565 | 065010R | MER6  | LDB SYMTF   |                            |
| C383* |       |         |       |             |                            |
| C384  | 05566 | 055011R | M2LOP | CPB SYMTA   | MORE SYMBOLS?              |
| C385  | 05567 | 027642R |       | JMP M4LOP   | NO                         |
| C386  | 05570 | 160001  |       | LDA 1,I     | YES                        |
| C387  | 05571 | 010062  |       | AND .7 ::   | ACCOUNT FOR                |
| C388  | 05572 | 044055  |       | ADB .2      | A FUNCTION                 |
| C389  | 05573 | 050062  |       | CPA .7 ::   | IS IT?                     |
| C390  | 05574 | 027566R |       | JMP M2LOP   | YES                        |
| C391  | 05575 | 005004  |       | INB         | NO, ACCOUNT FOR            |
| C392  | 05576 | 040047  |       | ADA M4      | SIMPLE VARIABLE            |
| C393  | 05577 | 002025  |       | SSA,INA,RSS | IS IT?                     |
| C394  | 05600 | 027566R |       | JMP M2LOP   | YES                        |
| C395  | 05601 | 002003  |       | SZA,RSS     | NO, # OF SUBSCRIPTS KNOWN? |
| C396  | 05602 | 015274R |       | JSB ERROR   | NO                         |
| C397  | 05603 | 002004  | MER10 | INA         | SAVE                       |
| C398  | 05604 | 072046R |       | STA MBOX1+1 | FLAG                       |
| C399  | 05605 | 075045R |       | STB MBOX1   | SAVE POINTER               |
| C400  | 05606 | 160001  |       | LDA 1,I     | DEFINED                    |
| C401  | 05607 | 002002  |       | SZA         | ARRAY?                     |
| C402  | 05610 | 027617R |       | JMP M3LOP   | YES                        |
| C403  | 05611 | 063557R |       | LDA STDIM   | NO, LOAD                   |
| C404  | 05612 | 035046R |       | ISZ MBOX1+1 | APPROPRIATE                |
| C405  | 05613 | 040064  |       | ADA .9      | STANDARD DIMENSIONS        |
| C406  | 05614 | 170001  |       | STA 1,I     | RECORD AS                  |
| C407  | 05615 | 044052  |       | ADB M1      | FORMAL AND ACTUAL          |
| C408  | 05616 | 170001  |       | STA 1,I     | DIMENSIONS                 |
| C409  | 05617 | 017130R | M3LOP | JSB MDIM    | SAVE STORAGE               |
| C410  | 05620 | 072046R |       | STA MBOX1+1 | REQUIREMENT                |
| C411  | 05621 | 065045R |       | LDB MBOX1   | LOAD                       |
| C412  | 05622 | 044051  |       | ADB M2      | ADDRESS OF                 |
| C413  | 05623 | 160001  |       | LDA 1,I     | ELEMENT SPACE              |
| C414  | 05624 | 012222R |       | AND INF     | REMOVE V.A. BIT            |
| C415  | 05625 | 050055  |       | CPA .2      | DEFINED IN COM?            |
| C416  | 05626 | 027640R |       | JMP MER7    | YES                        |
| C417  | 05627 | 062007R |       | LDA FDISK   | NO, USE CURRENT            |
| C418  | 05630 | 032263R |       | IOR FLGBT   | ADD V.A. FLAG              |
| C419  | 05631 | 170001  |       | STA 1,I     | FREE-CORE ADDRESS          |
| C420  | 05632 | 012222R |       | AND INF     |                            |
| C421  | 05633 | 103101  |       | CLO         |                            |
| C422  | 05634 | 042046R |       | ADA MBOX1+1 | UPDATE FREE-CORE           |
| C423  | 05635 | 072007R |       | STA FDISK   | ADDRESS                    |
| C424  | 05636 | 102201  |       | SOC         | OUT OF SPACE ?             |
| C425  | 05637 | 015274R |       | JSB ERROR   | YES                        |
| C426  | 05640 | 044056  | MER7  | ADB .3      | NO, ADVANCE POINTER        |
| C427  | 05641 | 027566R |       | JMP M2LOP   | TO NEXT ENTRY              |
| C428* |       |         |       |             |                            |
| C429  | 05642 | 065010C | M4LOP | LDB PBPTR   | INITIALIZE ALL             |
| C430  | 05643 | 060001  |       | LDA 1       |                            |
| C431  | 05644 | 003000  |       | CMA         |                            |



## PRE-EXECUTION PROCESSING

|       |       |         |                |                |
|-------|-------|---------|----------------|----------------|
| 0432  | 05645 | 042007R | ADA FDISK      | ARRAY ELEMENTS |
| 0433  | 05646 | 002020  | SSA            |                |
| 0434  | 05647 | 026173R | JMP XEC        | TO 'UNDEFINED' |
| 0435  | 05650 | 062263R | LDA MNEG       |                |
| 0436  | 05651 | 017055R | JSB STBI       |                |
| 0437  | 05652 | 005004  | INB            |                |
| 0438  | 05653 | 062264R | LDA MNEG+1     |                |
| 0439  | 05654 | 017055R | JSB STBI       |                |
| 0440  | 05655 | 005004  | INB            |                |
| 0441  | 05656 | 027643R | JMP M4LOP+1    |                |
| 0442* |       |         |                |                |
| 0443  | 05657 | 005001  | STOIM OCT 5001 |                |

## PRE-EXECUTION PROCESSING

```

C445*          *****
C446*          ENTER SYMBOL TABLE SUBROUTINE
C447*          *****
C448*
C449*          TRANSFER -(A) WORDS FROM THE BUFFER ADDRESSED
C450*          BY MBUF TO THE TOP OF THE SYMBOL TABLE.
C451*
C452 05660 000000 ESYMT NOP
C453 05661 073234R STA MBIN1      SAVE NEGATIVE OF LENGTH OF ENTRY
C454 05662 042010R ADA SYMTF
C455 05663 072010R STA SYMTF      MOVE SYMBOL TABLE START LOCATOR
C456 05664 073321R STA MBIN2      UP BY THE LENGTH OF ENTRY
C457 05665 003004 CMA,INA      CHECK THAT THE SYMBOL TABLE AND
C458 05666 042006R ADA FCORE      FOR TABLE DO NOT OVERLAP
C459 05667 002021 SSA,RSS
C460 05670 015274R JSB ERROR      OVERLAP ERROR
C461 05671 067722R MER8 LDB MBUF      POINTER TO REQD ENTRY
C462 05672 160001 LDA 1,I      TRANSFER ENTRY TO THE SYMBOL
C463 05673 173321R STA MBIN2,I TABLE
C464 05674 005004 INB
C465 05675 037321R ISZ MBIN2
C466 05676 037234R ISZ MBIN1
C467 05677 027672R JMP MER8+1
C468 05700 127660R JMP ESYMT,I RETURN
C469*
C470*          *****
C471*          SUBROUTINE TO SEARCH SYMBOL TABLE FOR AN ARRAY
C472*          *****
C473 05701 000000 MSYMT NOP      B GIVES ARRAY TYPE -3 = 1 DIM,
C474 05702 077234R STB MBIN1      -2 = 2DIM, -1 = UNDIMENSIONED
C475 05703 062045R LDA MBUX1      LOAD IDENTIFIER
C476 05704 017613R JSB SSYMT      SEARCH THE SYMBOL TABLE
C477 05705 005021 SSB,RSS
C478 05706 127701R JMP MSYMT,I FOUND, RETURN
C479 05707 037234R ISZ MBIN1      IF ARRAY UNDIMENSIONED
C480 05710 002001 RSS
C481 05711 027720R JMP MSYM      JUMP TO NOT FOUND EXIT
C482 05712 037234R ISZ MBIN1      SET UP TO CHECK THAT ARRAY DOES
C483 05713 040055 ADA .2      NOT APPEAR IN THE TABLE WITH
C484 05714 040052 ADA M1      DIFFERENT DIMENSIONS. CHANGE
C485 05715 017613R JSB SSYMT      TYPE 2 TO 1 & TYPE 1 TO 2 AND
C486 05716 005021 SSB,RSS      SEARCH AGAIN
C487 05717 015274R JSB ERROR      FOUND, INCONSISTENT DIMENSIONS
C488 05720 037701R MSYM ISZ MSYMT      NOT FOUND, INCREMENT RETURN
C489 05721 127701R JMP MSYMT,I ADDRESS AND RETURN
C490*
C491*
C492 05722 000045R MBUF DEF TEMPS
C493 00045 MBOX1 EQU TEMPS
C494 01234 MBIN1 EQU SLWST
C495 01321 MBIN2 EQU RSCHK
C496 00022 MPTR EQU SBPTR
C497 01256 MNPTR EQU OPCHK
C498 00056 COML EQU TEMPS+9
C499 00057 MWDNO EQU TEMPS+10

```

PRE-EXECUTION PROCESSING

C500 05701

DIGCT EQU MSYMT

```

C502*
C503***          ***
C504** EVALUATE A FORMULA **
C505***          ***
C506*
C507 05723 000000 FORMX NGP          FORMULA BEGINS IN (TEMPS)
C508 05724 005400          CLB          INITIALIZE OPERATOR
C509 05725 017234R          JSB SLWST          STACK
C510 05726 017062R FORM1 JSB LDIMP          FETCH OPERAND
C511 05727 035045R          ISZ TEMPS          SET FOR NEXT WORD OF FORMULA
C512 05730 012225R          AND UPDMK          EXTRACT OPERAND
C513 05731 072053R          STA TEMPS+6          AND SAVE IT
C514 05732 002003          SZA,RSS          NULL OPERAND?
C515 05733 027746R          JMP FORM2          YES
C516 05734 017243R          JSB BHSTP          SET STACK FOR OPERAND ADDRESS
C517 05735 002020          SSA          FLAG BIT SET?
C518 05736 025015R          JMP FORM4          YES
C519 05737 017613R          JSB SSYMT          FETCH OPERAND ADDRESS
C520 05740 005007          INB,SZB,RSS          EXISTANT?
C521 05741 027302R          JMP E8-1          NO
C522 05742 010062          AND .7          YES ::
C523 05743 050062          CPA .7          FUNCTION?
C524 05744 025033R          JMP FORM6          YES
C525 05745 175030R          STB HSIPT,I          NO, STACK OPERAND ADDRESS
C526 05746 017062R FORM2 JSB LDIMP          FETCH
C527 05747 012220R          AND UPMSK          OPERATOR
C528 05750 001727          ALF,ALF          POSITION IT
C529 05751 001200          RAL ::
C530 05752 064000          LDB 0          LOAD ADDRESS OF
C531 05753 045100R          ADB FOPBS          OPERATOR'S INFORMATION WORD
C532 05754 040043          ADA M8          NON-FORMULA
C533 05755 002020          SSA          OPERATOR?
C534 05756 005400          CLB          YES
C535 05757 042241R          ADA D53          NO, NON-FORMULA
C536 05760 002021          SSA,RSS          OPERATOR?
C537 05761 005400          CLB          YES
C538 05762 002400          CLA          NO
C539 05763 160001          LDA 1,1          LOAD INFORMATION WORD
C540 05764 012176R          AND MSK1          SAVE
C541 05765 072054R          STA TEMPS+7          PRECEDENCE
C542 05766 120001          XOR 1,1          SAVE
C543 05767 072053R          STA TEMPS+6          IDENTIFICATION
C544 05770 027776R          JMP FOR11
C545 05771 172026R FORM0 STA TSIPT,1          STACK HIGH WORD
C546 05772 062026R          LDA TSIPT          STACK OPERAND
C547 05773 172030R          STA HSIPT,I          ADDRESS
C548 05774 002004          INA          STORE
C549 05775 174000          STB 0,I          LOW WORD
C550 05776 162027R FOR11 LDA LSIPT,I          DOES OPERATOR
C551 05777 010074          AND MSK0          ON TOP OF
C552 06000 003000          CMA          OPERATOR STACK
C553 06001 042054R          ADA TEMPS+7          HAVE HIGHER
C554 06002 002020          SSA          PRECEDENCE?
C555 06003 025136R          JMP FORM9          YES, EXECUTE IT
C556 06004 002001          RSS          NO

```

|      |       |         |       |     |            |                           |
|------|-------|---------|-------|-----|------------|---------------------------|
| C557 | 06005 | 035027R | FOR10 | ISZ | LSTPT      |                           |
| C558 | 06006 | 065054R |       | LDB | TEMPS+7    | RETRIEVE PRECEDENCE       |
| C559 | 06007 | 045235R |       | ADB | M15        | NO, LEFT PARENTHESIS      |
| C560 | 06010 | 005020  |       | SSB |            | OR LEFT BRACKET?          |
| C561 | 06011 | 044070  |       | ADB | .15        | NO, RESTORE PRECEDENCE    |
| C562 | 06012 | 045053R |       | ADB | TEMPS+6    | COMBINE IDENTIFICATION    |
| C563 | 06013 | 017234R |       | JSB | SLWST      | WITH PRECEDENCE AND STACK |
| C564 | 06014 | 027726R |       | JMP | FORM1      |                           |
| C565 | 06015 | 052263R | FORM4 | CPA | FLGBT      | CONSTANT?                 |
| C566 | 06016 | 025024R |       | JMP | FORM5      | YES                       |
| C567 | 06017 | 010062  |       | AND | .7         | NO, PREDIFINED            |
| C568 | 06020 | 050062  |       | CPA | .7         | FUNCTION                  |
| C569 | 06021 | 025113R |       | JMP | FORM7      | YES                       |
| C570 | 06022 | 065056R |       | LDB | TEMPS+9    | NO, MUST BE A             |
| C571 | 06023 | 027745R |       | JMP | FORM2-1    | PARAMETER                 |
| C572 | 06024 | 065045R | FORM5 | LDB | TEMPS      | LOAD CONSTANT ADDRESS     |
| C573 | 06025 | 035045R |       | ISZ | TEMPS      | MOVE POINTER TO           |
| C574 | 06026 | 035045R |       | ISZ | TEMPS      | NEXT CODE WORD            |
| C575 | 06027 | 060001  |       | LDA | B          |                           |
| C576 | 06030 | 032263R |       | IUR | FLGBT      | ADD V.A. FLAG             |
| C577 | 06031 | 064000  |       | LDB | A          |                           |
| C578 | 06032 | 027745R |       | JMP | FORM2-1    |                           |
| C579 | 06033 | 075053R | FORM6 | STB | TEMPS+6    | SAVE SYMBOL TABLE POINTER |
| C580 | 06034 | 065026R |       | LDB | TSTPT      | SAVE CURRENT POINTER      |
| C581 | 06035 | 017234R |       | JSB | SLWST      | TO TEMPORARY STACK        |
| C582 | 06036 | 165053R |       | LDB | TEMPS+6, I |                           |
| C583 | 06037 | 017234R |       | JSB | SLWST      | SAVE FUNCTION ADDRESS     |
| C584 | 06040 | 063723R |       | LDA | FORMX      | SAVE CURRENT              |
| C585 | 06041 | 172030R |       | STA | HSTPT, I   | FORMX RETURN ADDRESS      |
| C586 | 06042 | 017723R |       | JSB | FORMX      | EVALUATE THE PARAMETER    |
| C587 | 06043 | 035045R |       | ISZ | TEMPS      | UPDATE FORMULA POINTER    |
| C588 | 06044 | 035045R |       | ISZ | TEMPS      | PAST RIGHT PARENTHESIS    |
| C589 | 06045 | 065045R |       | LDB | TEMPS      | SWITCH                    |
| C590 | 06046 | 162027R |       | LDA | LSTPT, I   | FORMULA POINTER           |
| C591 | 06047 | 012222R |       | AND | INF        |                           |
| C592 | 06050 | 072045R |       | STA | TEMPS      | TO FUNCTION'S             |
| C593 | 06051 | 175027R |       | STB | LSTPT, I   | FORMULA                   |
| C594 | 06052 | 065056R |       | LDB | TEMPS+9    | SET                       |
| C595 | 06053 | 162030R |       | LDA | HSTPT, I   | PARAMETER POINTER         |
| C596 | 06054 | 035027R |       | ISZ | LSTPT      | TO NEW PARAMETER,         |
| C597 | 06055 | 035030R |       | ISZ | HSTPT      | SAVING PREVIOUS           |
| C598 | 06056 | 175027R |       | STB | LSTPT, I   | SETTING ON                |
| C599 | 06057 | 072056R |       | STA | TEMPS+9    | LOW-CORE STACK            |
| C600 | 06060 | 052026R |       | CPA | TSTPT      | PROTECT PARAMETER IF      |
| C601 | 06061 | 017321R |       | JSB | RSCHK      | ON TEMPORARY STACK        |
| C602 | 06062 | 017723R |       | JSB | FORMX      | EVALUATE FUNCTION         |
| C603 | 06063 | 162027R |       | LDA | LSTPT, I   | RESTORE OLD               |
| C604 | 06064 | 072056R |       | STA | TEMPS+9    | PARAMETER POINTER         |
| C605 | 06065 | 065027R |       | LDB | LSTPT      | CUT BACK                  |
| C606 | 06066 | 044050  |       | ADB | M3         | LOW-CORE                  |
| C607 | 06067 | 075027R |       | STB | LSTPT      | STBCK                     |
| C608 | 06070 | 005004  |       | INB |            | RESTORE ORIGINBL          |
| C609 | 06071 | 160001  |       | LDA | 1, I       | TEMPORARY STACK           |
| C610 | 06072 | 072026R |       | STA | TSTPT      | POINTER                   |
| C611 | 06073 | 005004  |       | INB |            | RESTORE                   |

EXECUTE THE PROGRAM

|      |       |         |           |                 |
|------|-------|---------|-----------|-----------------|
| C612 | 06074 | 160001  | LDA 1,I   | ORIGINAL        |
| C613 | 06075 | 012222R | AND INF   |                 |
| C614 | 06076 | 072045R | STA TEMPS | FORMULA POINTER |
| C615 | 06077 | 101100  | SWP       |                 |
| C616 | 06100 | 017252R | JSB SITOP | POP RESULT      |

```

0618*
0619** PRE-DEFINED FUNCTIONS RETURN HERE WITH RESULT
0620*
0621 06101 172026R FOR12 STA TSTPT,I STORE HIGH WORD
0622 06102 062026R LDA TSTPT
0623 06103 002004 INA STORE
0624 06104 174000 STB 0,I LOW WORD
0625 06105 035030R ISZ HSTPT
0626 06106 165030R LDB HSTPT,I RESTORE FORMX
0627 06107 077723R STB FORMX RETURN ADDRESS
0628 06110 040052 ADA M1 STACK ADDRESS
0629 06111 172030R STA HSTPT,I OF RESULT
0630 06112 027746R JMP FORM2
0631 06113 062053R FORM7 LDA TEMPS+6 COMPUTE
0632 06114 001727 ALF,ALF
0633 06115 001722 ALF,RAL FUNCTION
0634 06116 010071 AND .31
0635 06117 042104R ADA PDFBS ADDRESS
0636 06120 164000 LDB 0,I
0637 06121 017234R JSB SLWST SAVE FUNCTION ADDRESS
0638 06122 063723R LDA FORMX SAVE CURRENT
0639 06123 172030R STA HSTPT,I FORMX RETURN ADDRESS
0640 06124 017723R JSB FORMX EVALUATE THE PARAMETER
0641 06125 035045R ISZ TEMPS UPDATE FORMULA POINTER
0642 06126 035045R ISZ TEMPS PAST RIGHT PARENTHESIS
0643 06127 165027R LDB LSTPT,I POP
0644 06130 003400 CCA FUNCTION
0645 06131 042027R ADA LSTPT ENTRY
0646 06132 072027R STA LSTPT ADDRESS
0647 06133 077660R STB ESYMT SAVE
0648 06134 017252R JSB STIOP POP PARAMETER
0649 06135 127660R JMP ESYMT,I EVALUATE FUNCTION
0650 06136 162027R FORM9 LDA LSTPT,I UNSTACK
0651 06137 007400 CCB OPERATOR
0652 06140 045027R ADB LSTPT INFORMATION
0653 06141 075027R STB LSTPT WORD
0654 06142 001727 ALF,ALF COMPUTE
0655 06143 010073 AND B177 SUBROUTINE
0656 06144 042103R ADA ARBAS ADDRESS
0657 06145 124000 JMP 0,I EXECUTE
0658**
0659*** EXECUTION BRANCH TABLE **
0660**
0661 06146 005406R XECTB DEF ELET LET
0662 06147 005233R DEF XEC4 DIM
0663 06150 005233R DEF XEC4 COM
0664 06151 005233R DEF XEC4 DEF
0665 06152 005233R DEF XEC4 REM
0666 06153 005410R DEF EGOTO GO TO
0667 06154 005412R DEF EIF IF
0668 06155 006422R DEF EFOR FOR
0669 06156 005515R DEF ENEXT NEXT
0670 06157 005560R DEF EGOSB GOSUB
0671 06160 005571R DEF ERTRN RETURN
0672 06161 001575R DEF RDYPT END

```

```

0673 06162 001575R      DEF RDYPT      STOP
0674 06163 006600R      DEF EWAIT     WAIT
0675 06164 006617R      DEF ECALL     CALL
0676 06165 006233R      DEF XEC4      DATA
0677 06166 006647R      DEF EREAD     READ
0678 06167 006707R      DEF EPRIN     PRINT
0901 06170 007074R      DEF EINPT     INPUT
0902 06171 007112R      DEF ERSTR     RESTORE
0903 06172 011465R      DEF EMAT      MAT
0904*      *      *      *      *      *      *      *      *      *      *      *      *      *
0905*
0906* *****
0907***
0908*** EXECUTE THE PROGRAM ***
0909***
0910* *****
0911*
0912**
0913***INITIALIZE FOR OUTPUT **
0914**
0915 06173 002400 XEC     CLA              SET COUNTER FOR
0916 06174 072034R      STA TYPE          CHARACTERS OUTPUTTED
0917 06175 072043R      STA XH            INITIALIZE
0918 06176 002004      INA              RANDOM
0919 06177 072044R      STA XL            VARIABLE
0920 06200 060052      LDA M1            SET EXECUTION
0921 06201 073264R      STA XIT          EXIT FLAG
0922**
0923*** INITIALIZE THE DATA POINTER **
0924**
0925 06202 003400      CCA              SET
0926 06203 072037R      STA DCCNT        'NO
0927 06204 072035R      STA DSTRT        DATA'
0928 06205 066007C      LDB PBUFF        CONDITION
0929 06206 075036R      STB NXIDT
0930 06207 162115R      LDA ADATA,I      SEARCH FOR FIRST
0931 06210 015302R      JSB STSRH        DATA STATEMENT
0932 06211 026214R      JMP XEC2        NONE FOUND
0933 06212 075035R      STB DSTRT        SAVE STATEMENT LOCATION
0934 06213 015271R      JSB SETDP        SET DATA POINTER
0935**
0936*** INITIALIZE STACK POINTERS **
0937**
0938 06214 065010R XEC2  LDB SYMTF        INITIALIZE
0939 06215 075030R      STB HSTPT        POINTERS TO
0940 06216 065006R      LDB FCORE        'HIGH CORE' STACK,
0941 06217 075026R      STB TSTPT        'TEMPORARY'
0942 06220 045134R      ADB .23          STACK, AND
0943 06221 075012R      STB LSTAK        'LOW CORE'
0944 06222 075027R      STB LSTPT        STACK
0945 06223 007000      CM8              DO
0946 06224 045030R      ADB HSTPT        STACKS
0947 06225 005020      SSB              MEET?
0948 06226 027240R      JMP E1          YES
0949 06227 065226R      LDB RMODE        NO, SHIFT TO

```



EXECUTE THE PROGRAM

|      |       |         |           |           |
|------|-------|---------|-----------|-----------|
| C050 | 06230 | 077131R | STB LISTR | RUN MODE  |
| C051 | 06231 | 066007C | LDB PBUFF | BEGIN     |
| C052 | 06232 | 026246R | JMP XEC5  | EXECUTION |

```

C054**
C055*** FIND NEXT STATEMENT TO BE EXECUTED **
C056**
C057 06235 062032R XEC4 LDA NXTST NEXT STATEMENT NUMBER
C058 06234 066031R LDB PRADD PROSPECTIVE ADDRESS
C059 06235 072032R STA NXTST
C060 06236 017051R JSB LDBI
C061 06237 052032R CPA NXTST DESIRED STATEMENT?
C062 06240 026247R JMP XEC6 YES
C063 06241 066007C LDB PRUFF NO, FIND
C064 06242 062032R LDA NXTST
C065 06243 016553R JSB FNDPS STATEMENT
C066 06244 000000 NOP NON-EXISTENT
C067 06245 015274R JSB ERROR STATEMENT
C068 06246 017051R XEC5 JSB LDBI SAVE NEW
C069 06247 072033R XEC6 STA .LNUM SEQUENCE NUMBER
C070**
C071*** SET SUCCESSOR STATEMENT **
C072**
C073 06250 016352R JSB FLWST
C074 06251 012220R AND UPMSK EXTRACT STATEMENT TYPE
C075 06252 001727 ALF,ALF POSITION
C076 06253 042102R ADA XECBR COMPUTE EXECUTION ADDRESS
C077 06254 124000 JMP 0,I BRANCH TO EXECUTION CODE
C078**
C079*** EVALUATE FORMULA AND RETURN RESULT **
C080**
C081 06255 000000 FETCH NOP
C082 06256 017723R JSB FORMX EVALUATE FORMULA
C083 06257 017266R JSB UPCHK
C084 06260 036030R ISZ HSIPT UNSTACK RESULT ADDRESS
C085 06261 006020 SSB RESULT ON DISK?
C086 06262 025266R JMP FTCH2 YES, LOAD A AND B WITH RESULT
C087 06263 104200 DLD 1,I LOAD RESULT
C088 06265 126255R JMP FETCH,I EXIT
C089 06266 060001 FTCH2 LDA B
C090 06267 017505R JSB FTHOP LOAD RESULT
C091 06270 126255R JMP FETCH,I
C092**
C093*** SET POINTER TO START OF DATA STATEMENT **
C094**
C095 06271 000000 SETDP NOP STATEMENT ADDRESS IN (B)
C096 06272 006004 INB LOAD
C097 06273 017051R JSB LDBI STATEMENT LENGTH
C098 06274 003004 CMA,INA SET
C099 06275 002004 INA DATA COUNTER
C100 06276 072037R STA DCCNT TO 1-STATEMENT LENGTH
C101 06277 006004 INB SET 'NEXT DATA' POINTER ONE
C102 06300 076036R STB NXIDT WORD ABOVE FIRST CONSTANT
C103 06301 126271R JMP SETDP,I
C104**
C105*** SEARCH FOR STATEMENT OF GIVEN TYPE **
C106**
C107 06302 000000 STSRH NOP TYPE IN (A), ADDRESS IN (B)

```

|         |                                |         |                  |                           |
|---------|--------------------------------|---------|------------------|---------------------------|
| C108    | 06303                          | 012220R | AND UPMSK        | EXTRACT                   |
| C109    | 06304                          | 072052R | STA TEMP4        | STATEMENT TYPE            |
| C110    | 06305                          | 060001  | STSR1 LDA 1      | EXTRACT                   |
| C111    | 06306                          | 040055  | ADA .2           | PROGRAM                   |
| C112    | 06307                          | 017204R | JSB DREAD        | STATEMENT                 |
| C113    | 06310                          | 012220R | AND UPMSK        | TYPE                      |
| C114    | 06311                          | 052052R | CPA TEMP4        | DESIRED TYPE?             |
| C115    | 06312                          | 025322R | JMP STSR2        | YES                       |
| C116    | 06313                          | 060001  | LDA 1            | NO, FETCH                 |
| C117    | 06314                          | 002004  | INA              | STATEMENT LENGTH          |
| C118    | 06315                          | 017204R | JSB DREAD        |                           |
| C119    | 06316                          | 044000  | ADB A            | COMPUTE NEW ADDRESS       |
| C120    | 06317                          | 056010C | CPB PBPTR        | PAST LAST STATEMENT?      |
| C121    | 06320                          | 125302R | JMP STSRH,1      | YES                       |
| C122    | 06321                          | 025305R | JMP STSR1        | NO                        |
| C123    | 06322                          | 036302R | STSR2 ISZ STSRH  |                           |
| C124    | 06323                          | 125302R | JMP STSRH,1      |                           |
| C125**  |                                |         |                  |                           |
| C126*** | FETCH A DATA ITEM **           |         |                  |                           |
| C127**  |                                |         |                  |                           |
| C128    | 06324                          | 000000  | FDATA NOP        |                           |
| C129    | 06325                          | 035037R | FDAT1 ISZ DCCNT  | MORE DATA?                |
| C130    | 06326                          | 025335R | JMP FDATA2       | YES                       |
| C131    | 06327                          | 162115R | LDA ADATA,1      | NO, SEARCH                |
| C132    | 06330                          | 065036R | LDB NXTDT        | FOR NEXT                  |
| C133    | 06331                          | 015302R | JSB STSRH        | DATA STATEMENT            |
| C134    | 06332                          | 015274R | JSB ERROR        | NONE FOUND                |
| C135    | 06333                          | 015271R | E4 JSB SETDP     | INITIALIZE THE            |
| C136    | 06334                          | 025325R | JMP FDATA1       | DATA POINTERS             |
| C137    | 06335                          | 035037R | FDATA2 ISZ DCCNT | UPDATE                    |
| C138    | 06336                          | 035037R | ISZ DCCNT        | POINTER                   |
| C139    | 06337                          | 035036R | ISZ NXTDT        |                           |
| C140    | 06340                          | 062036R | LDA NXTDT        |                           |
| C141    | 06341                          | 017204R | JSB DREAD        | LOAD                      |
| C142    | 06342                          | 035036R | ISZ NXTDT        | DATA                      |
| C143    | 06343                          | 073130R | STA TMP2         |                           |
| C144    | 06344                          | 062036R | LDA NXTDT        |                           |
| C145    | 06345                          | 017204R | JSB DREAD        |                           |
| C146    | 06346                          | 064000  | LDB A            | ITEM                      |
| C147    | 06347                          | 063130R | LDA TMP2         |                           |
| C148    | 06350                          | 035036R | ISZ NXTDT        | UPDATE POINTER            |
| C149    | 06351                          | 125324R | JMP FDATA,1      |                           |
| C150**  |                                |         |                  |                           |
| C151*** | SET FOR FOLLOWING STATEMENT ** |         |                  |                           |
| C152**  |                                |         |                  |                           |
| C153    | 06352                          | 000000  | FLWST NOP        | (B) HOLDS PRESENT ADDRESS |
| C154    | 06353                          | 060001  | LDA 1            | COMPUTE                   |
| C155    | 06354                          | 002004  | INA              | ADDRESS                   |
| C156    | 06355                          | 017204R | JSB DREAD        | OF                        |
| C157    | 06356                          | 040001  | ADA 1            | NEXT                      |
| C158    | 06357                          | 072031R | STA PRADD        | STATEMENT                 |
| C159    | 06360                          | 017204R | JSB DREAD        | RECORD THE                |
| C160    | 06361                          | 072032R | STA NXTST        | SEQUENCE NUMBER           |
| C161    | 06362                          | 044055  | ADB .2           | FETCH                     |
| C162    | 06363                          | 075045R | STB TEMPS        | FIRST WORD                |

## EXECUTE THE PROGRAM

```

C163 06364 017051R JSB LDB1 OF CURRENT
C164 06365 125352R JMP FLWST,I STATEMENT
C165**
C166*** SEARCH STACK FOR GIVEN FOR-VARIABLE **
C167**
C168 06366 000000 FVSRH NOP
C169 06367 017062R JSB LDIMP FETCH
C170 06370 012176R AND MSK1 FOR-VARIABLE
C171 06371 073440R STA EDELM SAVE FOR-VARIABLE
C172 06372 017613R JSB SSYMT FIND ADDRESS IN
C173 06373 005004 INB SYMBOL TABLE
C174 06374 062030R LDA HSTPT SAVE
C175 06375 072051R STA TEMP3 STACK TOP
C176 06376 052010R FVSR1 CPA SYMTF STACK BOTTOM?
C177 06377 125366R JMP FVSRH,I YES, EXIT VIA (P+1)
C178 06400 154000 CPB 0,1 MATCHING FOR-VARIABLE?
C179 06401 025404R JMP FVSR2 YES
C180 06402 040061 ADA .6 NO, MOVE TO
C181 06403 025376R JMP FVSR1 NEXT STACK ENTRY
C182 06404 035366R FVSR2 ISZ FVSRH EXIT
C183 06405 125366R JMP FVSRH,I VIA (P+2)
C184*
C185*** ***
C186** EXECUTE LET **
C187*** ***
C188*
C189 06406 017723R ELET JSB FORMX
C190 06407 025233R JMP XEC4
C191*
C192*** ***
C193** EXECUTE GO TO **
C194*** ***
C195*
C196 06410 017604R EGOTO JSB NXSQN LOAD SEQUENCE NUMBER
C197 06411 025234R JMP XEC4+1 FIND REFERENCED STATEMENT
C198*
C199*** ***
C200** EXECUTE IF **
C201*** ***
C202*
C203 06412 015255R EIF JSB FETCH FETCH VALUE OF FORMULA
C204 06413 002003 SZA,RSS RESULTANT TRUE?
C205 06414 025233R JMP XEC4 NO
C206 06415 035045R ISZ TEMPS YES, BRANCH TO
C207 06416 035045R ISZ TEMPS
C208 06417 035045R LD3 TEMPS FOLLOWING
C209 06420 017062R JSB LDIMP FOLLOWING STATEMENT
C210 06421 025251R JMP XSA AND EXECUTE
C211*
C212*** ***
C213** EXECUTE FOR **
C214*** ***
C215*
C216 06422 015366R EFOR JSB FVSRH FOR-VARIABLE ALREADY IN STACK?
C217 06423 025434R JMP EFOR1 NO

```

|      |       |         |                    |                                 |
|------|-------|---------|--------------------|---------------------------------|
| 0218 | 06424 | 072050R | STA TEMP2          | YES, SAVE SOURCE ADDRESS        |
| 0219 | 06425 | 040061  | ADA .6             | SAVE                            |
| 0220 | 06426 | 072052R | STA TEMP4          | .DESTINATION ADDRESS            |
| 0221 | 06427 | 075047R | STB TEMP1          | SAVE FOR-VARIABLE ADDRESS       |
| 0222 | 06430 | 015367R | JSB MVTOC          | COMPRESS STACK                  |
| 0223 | 06431 | 065047R | LDB TEMP1          | RESTORE FOR-VARIABLE ADDRESS    |
| 0224 | 06432 | 002400  | CLA                | COMPUTE                         |
| 0225 | 06433 | 002401  | CLA, RSS           | COMPUTE                         |
| 0226 | 06434 | 060045  | EFOR1 LDA M6       | NEW TOP OF                      |
| 0227 | 06435 | 042030R | ADA HSTPT          | FOR-STACK                       |
| 0228 | 06436 | 072030R | STA HSTPT          | POINTER                         |
| 0229 | 06437 | 072047R | STA TEMP1          |                                 |
| 0230 | 06440 | 003004  | CMA, INA           | STACK                           |
| 0231 | 06441 | 042027R | ADA LSTPT          |                                 |
| 0232 | 06442 | 002021  | SSA, RSS           | OVERFLOW?                       |
| 0233 | 06443 | 027240R | JMP E1             | YES                             |
| 0234 | 06444 | 175047R | STB TEMP1, I       | NO, RECORD FOR-VARIABLE ADDRESS |
| 0235 | 06445 | 017123R | JSB FORMX          | INITIALIZE FOR VARIABLE         |
| 0236 | 06446 | 035045R | ISZ TEMPS          |                                 |
| 0237 | 06447 | 035047R | ISZ TEMP1          | SAVE                            |
| 0238 | 06450 | 062047R | LDA TEMP1          | LIMIT                           |
| 0239 | 06451 | 072357R | STA ENEX2          | ADDRESS                         |
| 0240 | 06452 | 015255R | JSB FETCH          | FETCH                           |
| 0241 | 06453 | 172047R | STA TEMP1, I       | AND                             |
| 0242 | 06454 | 035047R | ISZ TEMP1          | STORE                           |
| 0243 | 06455 | 175047R | STB TEMP1, I       | LIMIT                           |
| 0244 | 06456 | 035047R | ISZ TEMP1          |                                 |
| 0245 | 06457 | 064051  | LDB M2             | SET FOR STEP SIZE               |
| 0246 | 06460 | 075324R | STB FDATA          | SIGN CHECK                      |
| 0247 | 06461 | 017062R | JSB LDIMP          | LOOK FOR                        |
| 0248 | 06462 | 002002  | SZA                | FOLLOWING 'STEP'                |
| 0249 | 06463 | 025467R | JMP EFOR2          | FOUND                           |
| 0250 | 06464 | 062261R | LDA HONE           | NOT FOUND,                      |
| 0251 | 06465 | 064055  | LDB .2             | DEFAULT                         |
| 0252 | 06466 | 002001  | RSS                | IS 1.0                          |
| 0253 | 06467 | 015255R | EFOR2 JSB FETCH    |                                 |
| 0254 | 06470 | 002020  | SSA                | STEP SIZE NEGATIVE?             |
| 0255 | 06471 | 035324R | ISZ FDATA          | YES                             |
| 0256 | 06472 | 172047R | STA TEMP1, I       | SAVE                            |
| 0257 | 06473 | 035047R | ISZ TEMP1          | STEP                            |
| 0258 | 06474 | 175047R | STB TEMP1, I       | SIZE                            |
| 0259 | 06475 | 035047R | ISZ TEMP1          | SET POINTER                     |
| 0260 | 06476 | 062032R | LDA NXIST          | TO STATEMENT                    |
| 0261 | 06477 | 172047R | STA TEMP1, I       | FOLLOWING THE FOR               |
| 0262 | 06500 | 162113R | EFOR3 LDA ANEXT, I | FIND                            |
| 0263 | 06501 | 065031R | LDB PRADD          | 'NEXT'                          |
| 0264 | 06502 | 015302R | JSB STSRH          | STATEMENT                       |
| 0265 | 06503 | 000000  | NOP                |                                 |
| 0266 | 06504 | 015352R | JSB FLWST          | FIND FOLLOWING STATEMENT        |
| 0267 | 06505 | 012176R | AND MSK1           | SAME                            |
| 0268 | 06506 | 053440R | CPA EDELM          | FOR-VARIABLE?                   |
| 0269 | 06507 | 002001  | RSS                | YES                             |
| 0270 | 06510 | 025500R | JMP EFOR3          | NO                              |
| 0271 | 06511 | 165030R | LDB HSTPT, I       | LOAD                            |
| 0272 | 06512 | 104200  | OLD 1, I           | VALUE OF FOR VARIABLE           |

```

06515 100001
C273 06514 025542R JMP .ENE2 CHECK ACCEPTABILITY
C274*
C275*** ***
C276** EXECUTE NEXT **
C277*** ***
C278*
C279 06515 015366R ENEXT JSB FVSRH FIND CORRESPONDING STACK ENTRY
C280 06516 025233R JMP XEC4 NONE PRESENT
C281 06517 072030R STA HSTPT RESET TOP OF STACK
C282 06520 075556R STB ENEX1 SAVE FOR-VARIABLE ADDRESS
C283 06521 002004 INA SAVE LIMIT
C284 06522 072557R STA ENEX2 ADDRESS
C285 06523 040055 ADA .2 SAVE STEP SIZE
C286 06524 072047R STA TEMP1 ADDRESS
C287 06525 064051 LDB M2 SET STEP SIZE
C288 06526 075324R STB FDATA SIGN CHECK
C289 06527 162047R LDA TEMP1,I LOAD
C290 06530 035047R ISZ TEMP1 STEP
C291 06531 165047R LDB TEMP1,I SIZE
C292 06532 035047R ISZ TEMP1
C293 06533 002020 SSA CHECK
C294 06534 035324R ISZ FDATA SIGN
C295 06535 015002X FAD ENEX1,I INCREMENT FOR VARIABLE
06536 105556R
C296 06537 172556R STA ENEX1,I AND
C297 06540 035556R ISZ ENEX1 SAVE
C298 06541 175556R STB ENEX1,I VALUE
C299 06542 015003X .ENE2 FSB ENEX2,I COMPUTE FOR VARIABLE LIMIT
06543 105557R
C300 06544 035324R ISZ FDATA POSITIVE STEP SIZE?
C301 06545 001600 ELA YES, COMPLEMENT SIGN
C302 06546 002020 SSA NO, NON-NEGATIVE RESULT?
C303 06547 025552R JMP ENEX3 NO
C304 06550 162047R LDA TEMP1,I YES, GO TO FIRST
C305 06551 025234R JMP XEC4+1 STATEMENT OF LOOP
C306 06552 062030R ENEX3 LDA HSTPT FAILS,
C307 06553 040061 ADA .6 ERASE
C308 06554 072030R STA HSTPT STACK
C309 06555 025233R JMP XEC4 ENTRY
C310 06556 000000 ENEX1 BSS 1
C311 06557 000000 ENEX2 BSS 1
C312*
C313*** ***
C314** EXECUTE GOSUB **
C315*** ***
C316*
C317 06560 000000 EGOSB NOP
C318 06561 017604R JSB NXSGN LOAD (A) WITH NEXT SEQ NUMBER
C319 06562 065032R LDB NXTST LOAD (B) WITH
C320 06563 072032R STA NXTST RETURN SEQUENCE NUMBER
C321 06564 017234R JSB SLWST STACK RETURN ON LOW-CORE STACK
C322 06565 040041 ADA M10 GOSUBS NESTED
C323 06566 052012R CPA LSTAK 10 DEEP?
C324 06567 015274R JSB ERROR YES

```

```
C325 06570 025233R E2      JMP XEC4      NO
C326*
C327***                      ***
C328** EXECUTE RETURN      **
C329***                      ***
C330*
C331 06571 065027R ERTRN LDB LSTPT      RETURN STACK
C332 06572 055012R      CPB LSTAK      EMPTY?
C333 06573 015274R      JSB ERROR      YES
C334 06574 162027R E3      LDA LSTPT,1  NO, LOAD RETURN ADDRESS
C335 06575 044052      ADB M1      RESET
C336 06576 075027R      STB LSTPT      STACK POINTER
C337 06577 025234R      JMP XEC4+1
```

## EXECUTE THE PROGRAM

```

C339*
C340***          ***
C341** EXECUTE WAIT **
C342***          ***
C343*
C344 06600 036045R EWAIT ISZ TEMPS      POINT (TEMPS) TO FORMULA
C345 06601 016255R      JSB FETCH      FETCH EVALUATED FORMULA
C346 06602 002020      SSA      NEGATIVE?
C347 06603 026233R      JMP XEC4      YES
C348 06604 017160R      JSB IFIX      CONVERT TO INTEGER
C349 06605 002404      CLA,INA      LARGE INTEGER
C350 06606 002003      SZA,RSS      SMALL
C351 06607 007021      CMB,SSB,RSS      INTEGER?
C352 06610 066263R      LDB MNEG      NO
C353 06611 006007 EWAIT INB,SZB,RSS      WAIT?
C354 06612 026233R      JMP XEC4      NO
C355 06613 062254R      LDA M310      YES, SET INNER LOOP
C356 06614 002006      INA,SZA      MORE?
C357 06615 026614R      JMP *-1      YES
C358 06616 026611R      JMP EWAIT1      NO
C359*
C360***          ***
C361** EXECUTE CALL **
C362***          ***
C363*
C364 06617 036045R ECALL ISZ TEMPS      FETCH
C365 06620 036045R      ISZ TEMPS      SUBROUTINE
C366 06621 017062R      JSB LDTMP      NUMBER
C367 06622 064000      LDB A
C368 06623 017115R      JSB FND5B      FIND
C369 06624 006004      INB      ENTRY
C370 06625 164001      LDB 1,I      POINT AND
C371 06626 075060R ECAL4 STB TEMPS+11
C372 06627 062030R      LDA HSTPT      SAVE HIGH CORE
C373 06630 072057R      STA TEMPS+10      STACK POINTER
C374 06631 036045R ECAL1 ISZ TEMPS      ANY
C375 06632 017062R      JSB LDTMP      PARAMETERS
C376 06633 052202R      CPA B2000 ::
C377 06634 026637R      JMP ECAL2      NO
C378 06635 017723R      JSB FORMX      YES, EVALUATE
C379 06636 026631R      JMP ECAL1      A PARAMETER
C380 06637 003400 ECAL2 CCA      LOAD ADDRESS OF
C381 06640 042057R      ADA TEMPS+10      PARAMETER ADDRESSES
C382 06641 116060R      JSB TEMPS+11,I      AND BRANCH TO SUBROUTINE
C383 06642 052057R      LDA TEMPS+10      RESTORE
C384 06643 072030R      STA HSTPT
C385 06644 066006R      LDB FCORE      POINTERS
C386 06645 076026R      STB TSTPT
C387 06646 026233R      JMP XEC4

```



## EXECUTE THE PROGRAM

```

C389*
C390***          ***
C391** EXECUTE READ **
C392***          ***
C393*
C394 06647 056031R EREAD CPB PRADD      END-OF-STATEMENT?
C395 06650 026233R      JMP XEC4        YES
C396 06651 017723R      JSB FORMX       NO, EVALUATE THE NEXT RECORD
C397 06652 162030R      LDA HSTPT,I    RECORD
C398 06653 073461R      STA OUTLN      ADDRESS
C399 06654 002020      SSA
C400 06655 026665R      JMP ERD2
C401 06656 016324R      JSB FDATA      GET DATA ITEM
C402 06657 104400      DST OUTLN,I    STORE DATA ITEM
      06660 101461R
C403 06661 036030R ERD1  ISZ HSTPT
C404 06662 066045R      LDB TEMPS
C405 06663 006004      INB
C406 06664 026647R      JMP EREAD
C407 06665 016324R ERD2  JSB FDATA
C408 06666 017342R      JSB DDST
C409 06667 001461R      DEF OUTLN
C410 06670 026661R      JMP ERD1
C411**
C412*** INITIALIZE FOR PRINT **
C413**
C414 06671 000000 PRNIN NOP
C415 06672 003400      CCA              INITIALIZE
C416 06673 042016R      ADA .BUFA      BUFFER
C417 06674 072017R      STA BADDR      POINTER
C418 06675 062034R      LDA TYPE      INITIALIZE
C419 06676 003004      CMA,INA        'CHARACTERS OUTPUTTED'
C420 06677 072020R      STA CCNT      COUNTER
C421 06700 002011      SLA,RSS        START ON ODD CHARACTER POSITION?
C422 06701 126671R      JMP PRNIN,I   NO
C423 06702 040052      ADA M1        YES, BIAS
C424 06703 072020R      STA CCNT      COUNTER
C425 06704 002400      CLA            OUTPUT A
C426 06705 017477R      JSB OUTCR     NULL CHARACTER
C427 06706 126671R      JMP PRNIN,I
C428*
C429***          ***
C430** EXECUTE PRINT **
C431***          ***
C432*
C433 06707 002400 EPRIN CLA
C434 06710 072272R      STA PARM
C435 06711 016671R      JSB PRNIN
C436 06712 002400      CLA            TURN ON
C437 06713 026720R      JMP EPR11+1   'END-OF-LINE' FLAG
C438 06714 002400 EPR10 CLA            EXECUTE COMMA
C439 06715 052402R      CPA EOL       IF NOT FOLLOWING
C440 06716 017440R      JSB EDELM     A TAB
C441 06717 003400 EPR11 CCA            TURN OFF
C442 06720 072402R      STA EOL       'END-OF-LINE' FLAG

```

## EXECUTE THE PROGRAM

|      |       |         |       |         |                          |
|------|-------|---------|-------|---------|--------------------------|
| 0443 | 06721 | 017062R | JSB   | LDTMP   | EXTRACT                  |
| 0444 | 06722 | 012225R | AND   | OPDMK   | OPERAND                  |
| 0445 | 06723 | 002002  | SZA   |         | NULL?                    |
| 0446 | 06724 | 025744R | JMP   | EPRI3   | NO, FORMULA OR TAB       |
| 0447 | 06725 | 035045R | EPRI2 | ISZ     | TEMPS                    |
| 0448 | 06726 | 065045R | LDB   | TEMPS   | MORE                     |
| 0449 | 06727 | 055031R | CPB   | PRADD   | STATEMENT?               |
| 0450 | 06730 | 027010R | JMP   | EPRI7   | NO                       |
| 0451 | 06731 | 017062R | JSB   | LDTMP   | YES, EXTRACT             |
| 0452 | 06732 | 012220R | AND   | OPMSK   | NEXT OPERATOR            |
| 0453 | 06733 | 052177R | CPA   | B1000   | ::                       |
| 0454 | 06734 | 025714R | JMP   | EPRI0   | YES                      |
| 0455 | 06735 | 052200R | CPA   | B1400   | ::                       |
| 0456 | 06736 | 025717R | JMP   | EPRI1   | YES                      |
| 0457 | 06737 | 052174R | CPA   | B400    |                          |
| 0458 | 06740 | 025753R | JMP   | EPRI4   | YES                      |
| 0459 | 06741 | 003400  | CCA   |         | NO, MUST BE +, -, OR (   |
| 0460 | 06742 | 042045R | ADA   | TEMPS   | BACKUP TO PRIOR          |
| 0461 | 06743 | 072045R | STA   | TEMPS   | NULL OPERAND             |
| 0462 | 06744 | 003400  | EPRI3 | CCA     | SET                      |
| 0463 | 06745 | 072402R | STA   | EOL     | TAB FLAG                 |
| 0464 | 06746 | 016255R | JSB   | FETCH   | EVALUATE                 |
| 0465 | 06747 | 035402R | ISZ   | EOL     | TAB?                     |
| 0466 | 06750 | 025725R | JMP   | EPRI2   | YES                      |
| 0467 | 06751 | 017426R | JSB   | ENOUT   | NO, PRINT NUMBER         |
| 0468 | 06752 | 025725R | JMP   | EPRI2   |                          |
| 0469 | 06753 | 002400  | EPRI4 | CLA     | TURN ON                  |
| 0470 | 06754 | 072402R | STA   | EOL     | 'END-OF-LINE' FLAG       |
| 0471 | 06755 | 073234R | STA   | SLWST   | ZERO                     |
| 0472 | 06756 | 073461R | STA   | OUTLN   | CHARACTER COUNT          |
| 0473 | 06757 | 017051R | EPRI5 | JSB     | LDB1                     |
| 0474 | 06760 | 010074  | AND   | MSK0    | NON-NULL                 |
| 0475 | 06761 | 002003  | SZA   | RSS     | LOW CHARACTER?           |
| 0476 | 06762 | 025773R | JMP   | EPRI6   | NO                       |
| 0477 | 06763 | 037461R | ISZ   | OUTLN   | YES, COUNT IT            |
| 0478 | 06764 | 005004  | INB   |         |                          |
| 0479 | 06765 | 017051R | JSB   | LDB1    |                          |
| 0480 | 06766 | 012220R | AND   | OPMSK   |                          |
| 0481 | 06767 | 052174R | CPA   | B400    | ::                       |
| 0482 | 06770 | 025773R | JMP   | EPRI6   | YES                      |
| 0483 | 06771 | 037461R | ISZ   | OUTLN   | NO, COUNT HIGH CHARACTER |
| 0484 | 06772 | 025757R | JMP   | EPRI5   |                          |
| 0485 | 06773 | 057461R | EPRI6 | LDB     | OUTLN                    |
| 0486 | 06774 | 045020R | ADB   | CCNT    | WILL                     |
| 0487 | 06775 | 052272R | LDA   | PARM    | LINE                     |
| 0488 | 06776 | 002021  | SSA   | RSS     |                          |
| 0489 | 06777 | 027003R | JMP   | *+4     |                          |
| 0490 | 07000 | 045237R | ADB   | M21     |                          |
| 0491 | 07001 | 005021  | SSB   | RSS     |                          |
| 0492 | 07002 | 015274R | WRER  | JSB     | ERROR                    |
| 0493 | 07003 | 045250R | WRERR | ADB     | M73                      |
| 0494 | 07004 | 005021  | SSB   | RSS     | 72 CHARACTERS?           |
| 0495 | 07005 | 017461R | JSB   | OUTLN   | YES, GET FRESH LINE      |
| 0496 | 07006 | 017172R | JSB   | OUTST   | OUTPUT STRING            |
| 0497 | 07007 | 025721R | JMP   | EPRI1+2 |                          |

## EXECUTE THE PROGRAM

|         |         |             |       |              |                                |
|---------|---------|-------------|-------|--------------|--------------------------------|
| C498    | 07010   | 036402R     | EPRI7 | ISZ EOL      | 'END-OF-LINE' ?                |
| C499    | 07011   | 027034R     |       | JMP EPRI8    | YES                            |
| C500    | 07012   | 066034R     |       | LDB TYPE     | NO, LOAD COUNT OF              |
| C501    | 07013   | 007004      |       | CMB, INB     | CHARACTERS OUTPUTTED           |
| C502    | 07014   | 076272R     |       | STB PARM     |                                |
| C503    | 07015   | 062171R     |       | LDA B137     |                                |
| C504    | 07016   | 017477R     |       | JSB OUTCR    |                                |
| C505    | 07017   | 066272R     |       | LDB PARM     |                                |
| C506    | 07020   | 062020R     |       | LDA CCNT     | LOAD LINE LENGTH               |
| C507    | 07021   | 003004      |       | CMA, INA     | SAVE NEW COUNT OF              |
| C508    | 07022   | 072034R     |       | STA TYPE     | CHARACTERS OUTPUTTED           |
| C509    | 07023   | 040001      |       | ADA 1        | COMPUTE CHARACTERS NOT YET OUT |
| C510    | 07024   | 004010      |       | SLB          | CORRECT FOR START ON           |
| C511    | 07025   | 040052      |       | ADA M1       | ODD PRINT POSITION             |
| C512    | 07026   | 003004      |       | CMA, INA     |                                |
| C513    | 07027   | 066016R     |       | LDB .BUFA    | OUTPUT                         |
| C514    | 07030   | 002002      |       | SZA          | NON-EMPTY                      |
| C515    | 07031   | 017161R     |       | JSB EXECW    | BUFFER                         |
| C516    | 07032   | 036034R     |       | ISZ TYPE     |                                |
| C517    | 07033   | 026233R     |       | JMP XEC4     |                                |
| C518    | 07034   | 017461R     | EPRI8 | JSB OUTLN    | PRINT LINE                     |
| C519    | 07035   | 026233R     |       | JMP XEC4     |                                |
| C520**  |         |             |       |              |                                |
| C521*** | TAB     | TELEPRINTER | **    |              |                                |
| C522**  |         |             |       |              |                                |
| C523    | 07036   | 117062R     | ETAB  | JSB IENTA, I | SMALL INTEGER?                 |
| C524    | 07037   | 027060R     |       | JMP ETAB1    | NO                             |
| C525    | 07040   | 006400      |       | CLB          | YES, SET                       |
| C526    | 07041   | 076402R     |       | STB EOL      | 'TAB' FLAG TRUE                |
| C527    | 07042   | 042247R     |       | ADA M72      | EXCEED                         |
| C528    | 07043   | 002021      |       | SSA, RSS     | 72?                            |
| C529    | 07044   | 027060R     |       | JMP ETAB1    | YES                            |
| C530    | 07045   | 003004      |       | CMA, INA     | NO, COMPUTE                    |
| C531    | 07046   | 042247R     |       | ADA M72      | BLANKS?                        |
| C532    | 07047   | 042020R     |       | ADA CCNT     | REQUIRED                       |
| C533    | 07050   | 002021      |       | SSA, RSS     | ANY?                           |
| C534    | 07051   | 026101R     |       | JMP FOR12    | NO                             |
| C535    | 07052   | 073461R     |       | STA OUTLN    | YES,                           |
| C536    | 07053   | 062141R     |       | LDA .32      | OUTPUT                         |
| C537    | 07054   | 017477R     |       | JSB OUTCR    | REQUIRED                       |
| C538    | 07055   | 037461R     |       | ISZ OUTLN    | NUMBER                         |
| C539    | 07056   | 027053R     |       | JMP *-3      | OF BLANKS                      |
| C540    | 07057   | 026101R     |       | JMP FOR12    |                                |
| C541    | 07060   | 017461R     | ETAB1 | JSB OUTLN    | OUTPUT THE                     |
| C542    | 07061   | 026101R     |       | JMP FOR12    | LINE                           |
| C543*   |         |             |       |              |                                |
| C544    | 07062   | 011420R     | IENTA | DEF .IENT    |                                |
| C545*   |         |             |       |              |                                |
| C546*** |         |             | ***   |              |                                |
| C547**  | EXECUTE | INPUT       | **    |              |                                |
| C548*** |         |             | ***   |              |                                |
| C549*   |         |             |       |              |                                |
| C550    | 07063   | 002006      | EINP1 | INA, SZA     | END-OF-INPUT?                  |
| C551    | 07064   | 017667R     |       | JSB DRQST    | YES, CALL FOR MORE             |
| C552    | 07065   | 016402R     | EINP2 | JSB CONST    | CONVERT AND STORE NUMBER       |

## EXECUTE THE PROGRAM

|      |       |         |                 |                              |
|------|-------|---------|-----------------|------------------------------|
| C553 | 07065 | 027063R | JMP EINP1       | NOT NUMBER                   |
| C554 | 07067 | 066045R | LDB TEMPS       | END-OF-                      |
| C555 | 07070 | 006004  | INB             |                              |
| C556 | 07071 | 056031R | CPB PRADD       | STATEMENT?                   |
| C557 | 07072 | 027106R | JMP EINP3       | YES                          |
| C558 | 07073 | 050065  | CFA .10         | NO, INSURE MORE INPUT        |
| C559 | 07074 | 017667R | EINP1 JSB DRGST | CALL FOR INPUT               |
| C560 | 07075 | 017723R | JSB FORMX       | COMPUTE THE VARIABLE ADDRESS |
| C561 | 07076 | 162030R | LDA HSTPT,I     |                              |
| C562 | 07077 | 002020  | SSA             |                              |
| C563 | 07100 | 027103R | JMP *+3         |                              |
| C564 | 07101 | 003400  | CCA             | STORE                        |
| C565 | 07102 | 142030R | ADA HSTPT,I     | ADDRESS-1                    |
| C566 | 07103 | 036030R | LSZ HSTPT       | IN                           |
| C567 | 07104 | 072022R | STA SBPTR       | POINTER                      |
| C568 | 07105 | 027065R | JMP EINP2       |                              |
| C569 | 07106 | 002400  | EINP3 CLA       | RESET                        |
| C570 | 07107 | 072034R | STA TYPE        | OUTPUT BUFFER                |
| C571 | 07110 | 026233R | JMP XEC4        |                              |

```

C573**
C574*** EXIT FORMULA ON EMPTY STACK **
C575**
C576 07111 105723R DEF FORMX,I
C577*
C578*** ***
C579** EXECUTE RESTORE **
C580*** ***
C581*
C582 07112 066035R ERSTR LDB DSTRT GET FIRST DATA STATEMENT ADDRESS
C583 07113 054052 CPB M1 IMPOSSIBLE ADDRESS?
C584 07114 026233R JMP XEC4 YES, DONE
C585 07115 016271R JSB SETDP NO, SET DATA POINTER
C586 07116 026233R JMP XEC4 DONE
C587**
C588*** FORMULA OPERATOR JUMP TABLE **
C589**
C590 07117 007164R AROT8 DEF ESCMA SUBSCRIPT SEPARATOR
C591 07120 007251R DEF ESTR ASSIGNMENT OPERATOR
C592 07121 007344R DEF EFAD '+'
C593 07122 007350R DEF EFSB '- '
C594 07123 007354R DEF EFMP '* '
C595 07124 007360R DEF EFDV '/ '
C596 07125 007364R DEF EPWR '^ '
C597 07126 007516R DEF EGTRT '> '
C598 07127 007524R DEF ELST '< '
C599 07130 007554R DEF ENEQL '# '
C600 07131 007532R DEF EEQL '='
C601 07132 007567R DEF EUMIN UNARY '- '
C602 07133 007572R DEF ELBRC '['
C603 07134 005726R DEF FORM1 '('
C604 07135 005776R DEF FOR11 UNARY
C605 07136 007153R DEF EOR OR
C606 07137 007160R DEF EAND AND
C607 07140 007600R DEF ENOT NOT
C608 07141 007540R DEF EGORE '>='
C609 07142 007546R DEF ELURE '<='
C610**
C611*** EXECUTE A BINARY OPERATOR **
C612**
C613 07143 000000 BINOP NOP SAVE
C614 07144 017266R JSB OPCHK SAVE ADDRESS OF
C615 07145 077152R STB BIN02 TOP OPERAND
C616 07146 035030R ISZ HSTPT UNSTACK ADDRESS
C617 07147 017252R JSB STTOP LOAD SECOND OPERAND
C618 07150 127143R JMP BINOP,I
C619 07151 000000 BIN01 BSS 1
C620 07152 000000 BIN02 BSS 1
C621**
C622*** EXECUTE OR **
C623**
C624 07153 017143R EOR JSB BINOP VALIDATE
C625 07154 002002 ORS SZA SECOND OPERAND NON-ZERO?
C626 07155 027564R JMP TRUE YES
C627 07156 017517R ORS1 JSB LDUP2 NO, CHECK SECOND

```

|         |                |              |           |                      |
|---------|----------------|--------------|-----------|----------------------|
| 0628    | 07157          | 027557R      | JMP ENEQ1 | OPERAND              |
| 0629**  |                |              |           |                      |
| 0630*** | EXECUTE AND ** |              |           |                      |
| 0631**  |                |              |           |                      |
| 0632    | 07160          | 017143R EAND | JSB BINOP | VALIDATE             |
| 0633    | 07161          | 002003 ANDS  | SZA,RSS   | SECOND OPERAND ZERO? |
| 0634    | 07162          | 027561R      | JMP FALSE | YES                  |
| 0635    | 07163          | 027156R      | JMP URS1  | NO                   |

## EXECUTE THE PROGRAM

C637\*\*

C638\*\*\* EXECUTE SUBSCRIPT COMMA \*\*

C639\*\*

|      |       |         |       |             |                                  |
|------|-------|---------|-------|-------------|----------------------------------|
| C640 | 07164 | 017234R | ESCMA | JSB ESBS    | INTEGERIZE COLUMN SUBSCRIPT      |
| C641 | 07165 | 035027R |       | ISZ LSTPT   |                                  |
| C642 | 07166 | 017234R |       | JSB ESBS    | INTEGERIZE ROW SUBSCRIPT         |
| C643 | 07167 | 165030R |       | LDB HSTPT,I | FETCH                            |
| C644 | 07170 | 044055  |       | ADB .2      | SUBSCRIPT                        |
| C645 | 07171 | 160001  |       | LDA 1,I     | BOUNDS                           |
| C646 | 07172 | 010074  |       | AND MSK0    | SAVE                             |
| C647 | 07173 | 073461R |       | STA OUTLN   | COLUMN BOUND                     |
| C648 | 07174 | 160001  |       | LDA 1,I     | EXTRACT                          |
| C649 | 07175 | 001727  |       | ALF,ALF     | ROW                              |
| C650 | 07176 | 010074  |       | AND MSK0    | BOUND                            |
| C651 | 07177 | 003004  |       | CMA,INA     | ACTUAL                           |
| C652 | 07200 | 142027R |       | ADA LSTPT,I | ROW SUBSCRIPT                    |
| C653 | 07201 | 002021  |       | SSA,RSS     | LEGAL?                           |
| C654 | 07202 | 027221R |       | JMP E6-1    | NO                               |
| C655 | 07203 | 063461R |       | LDA OUTLN   | YES                              |
| C656 | 07204 | 050054  |       | CPA .1      | COLUMN MATRIX?                   |
| C657 | 07205 | 027211R |       | JMP ESCM1   | YES                              |
| C658 | 07206 | 100200  |       | MPY LSTPT,I | NO, COMPUTE ADDRESS DISPLACEMENT |
|      | 07207 | 100027R |       |             |                                  |
| C659 | 07210 | 002001  |       | RSS         | DUE TO ROWS                      |
| C660 | 07211 | 162027R | ESCM1 | LDA LSTPT,I |                                  |
| C661 | 07212 | 007400  |       | CCB         | UNSTACK                          |
| C662 | 07213 | 045027R |       | ADB LSTPT   | ROW                              |
| C663 | 07214 | 076027R |       | STB LSTPT   | SUBSCRIPT                        |
| C664 | 07215 | 067461R |       | LDB OUTLN   | ACTUAL                           |
| C665 | 07216 | 007004  |       | CMB,INB     | COLUMN                           |
| C666 | 07217 | 145027R |       | ADB LSTPT,I | SUBSCRIPT                        |
| C667 | 07220 | 005021  |       | SSB,RSS     | LEGAL?                           |
| C668 | 07221 | 015274R |       | JSB ERROR   | NO                               |
| C669 | 07222 | 142027R | E6    | ADA LSTPT,I | YES, ADD IN COLUMN DISPLACEMENT  |
| C670 | 07223 | 001000  |       | ALS         | DOUBLE DISPLACEMENT              |
| C671 | 07224 | 165030R |       | LDB HSTPT,I | COMPUTE                          |
| C672 | 07225 | 140001  |       | ADA 1,I     | ACTUAL                           |
| C673 | 07226 | 032263R |       | IGR FLGHT   | ADD V.A. BIT                     |
| C674 | 07227 | 172030R |       | STA HSTPT,I | ADDRESS                          |
| C675 | 07230 | 065027R |       | LDB LSTPT   | UNSTACK                          |
| C676 | 07231 | 044052  |       | ADB M1      |                                  |
| C677 | 07232 | 076027R |       | STB LSTPT   | [                                |
| C678 | 07233 | 027726R |       | JMP FORM1   |                                  |

C679\*\*

C680\*\*\* INTEGERIZE A SUBSCRIPT \*\*

C681\*\*

|      |       |         |      |           |                      |
|------|-------|---------|------|-----------|----------------------|
| C682 | 07234 | 000000  | ESBS | NOP       |                      |
| C683 | 07235 | 017266R |      | JSB OPCHK | VALIDATE SUBSCRIPT   |
| C684 | 07236 | 005021  |      | SSB,RSS   | SUBSCRIPT ON DISK?   |
| C685 | 07237 | 027243R |      | JMP ESB1  | NO, FETCH SUBSCRIPT  |
| C686 | 07240 | 060001  |      | LDA B     |                      |
| C687 | 07241 | 017505R |      | JSB FTHOP | YES, FETCH FROM DISK |
| C688 | 07242 | 027245R |      | JMP *+3   |                      |
| C689 | 07243 | 104200  | ESB1 | OLD 1,I   |                      |
|      | 07244 | 100001  |      |           |                      |

EXECUTE THE PROGRAM

|      |       |         |             |                        |
|------|-------|---------|-------------|------------------------|
| C690 | 07245 | 017147R | JSB SBFIX   | INTEGERIZE             |
| C691 | 07246 | 175027R | STB LSTPT,I | SAVE IN OPERATOR STACK |
| C692 | 07247 | 035030R | ISZ HSIPT   | POP OPERAND STACK      |
| C693 | 07250 | 127234R | JMP ESBS,I  |                        |



## EXECUTE THE PROGRAM

```

C695**
C696*** EXECUTE STORE **
C697**
C698 07251 065054R ESTR LDB TEMPS+7 IS NEXT OPERATOR
C699 07252 006002 SZB AN END-OF-FORMULA?
C700 07253 025005R JMP FOR10 NO, DEFER AND STORE
C701 07254 055053R CPB TEMPS+6 YES, FIRST STORE OPERATOR USED?
C702 07255 027305R JMP ESTR2 YES
C703 07256 162030R ESTR1 LDA HSIPT,I SET
C704 07257 072056R STA TEMPS+9 .DESTINATION
C705 07260 062053R LDA TEMPS+6 SOURCE ADDRESS IN (A)
C706 07261 002020 SSA SOURCE ADDR. ON DISK?
C707 07262 027311R JMP ESTR4 YES, TRANSFER DATA
C708 07263 164000 LDB 0,1 TRANSFER HIGH
C709 07264 073130R STA TMP2 SAVE SOURCE ADDR.
C710 07265 062056R LDA TEMPS+9 .DESTINATION ADDR ON DISK?
C711 07266 002020 SSA
C712 07267 017334R JSB ESTR5 STORE DATA & RETURN (P+2)
C713 07270 175056R STB TEMPS+9,I PART OF SOURCE
C714 07271 063130R LDA TMP2
C715 07272 035056R ISZ TEMPS+9 UPDATE
C716 07273 002004 INA POINTERS
C717 07274 164000 LDB 0,1 TRANSFER LOW
C718 07275 073130R STA TMP2 SAVE SOURCE ADDR.
C719 07276 062056R LDA TEMPS+9 .DESTINATION ADDR. ON DISK?
C720 07277 002020 SSA
C721 07300 017334R JSB ESTR5 YES, STORE DATA & RETURN (P+2)
C722 07301 175056R STB TEMPS+9,I PART OF SOURCE
C723 07302 063130R LDA TMP2
C724 07303 035030R ISZ HSTPT POP STACK
C725 07304 027776R JMP FOR11
C726 07305 017266R ESTR2 JSB OPCHK SAVE ADDRESS
C727 07306 075053R STB TEMPS+6 OF QUANTITY
C728 07307 035030R ISZ HSTPT YES, POP HIGH-CORE
C729 07310 027256R JMP ESTR1 STACK AND EXECUTE STORE
C730 07311 012222R ESTR4 AND INF REMOVE V.A. BIT
C731 07312 073130R STA TMP2 SAVE SOURCE ADDRESS
C732 07313 017204R JSB DREAD HIGH PART OF SOURCE--> (A)
C733 07314 070001 STA B
C734 07315 062056R LDA TEMPS+9 .DESTINATION ON DISK?
C735 07316 002020 SSA
C736 07317 017334R JSB ESTR5 YES, STORE LOW PART OF SOURCE
C737 07320 175056R STB TEMPS+9,I
C738 07321 035056R ISZ TEMPS+9 UPDATE POINTERS
C739 07322 037130R ISZ TMP2
C740 07323 063130R LDA TMP2 GET SOURCE ADDR.
C741 07324 017204R JSB DREAD LOW PART OF SOURCE --> (A)
C742 07325 070001 STA B
C743 07326 062056R LDA TEMPS+9 .DESTINATION ON DISK?
C744 07327 002020 SSA
C745 07330 017334R JSB ESTR5 YES, STORE HIGH PART OF SOURCE
C746 07331 175056R STB TEMPS+9,I
C747 07332 035030R ISZ HSTPT POP HIGH CORE
C748 07333 027776R JMP FOR11
C749 07334 000000 ESTR5 NOP

```

## EXECUTE THE PROGRAM

```

C0750 07335 012222R      AND INF      REMOVE V.A. BIT
C0751 07336 073132R      STA TMP3      AND SAVE
C0001 07337 060001      LDA B
C0002 07340 017151R      JSB DSTOR      (A)--> V.A. ON DISK
C0003 07341 015152R      DEF TMP3
C0004 07342 037334R      ISZ ESTR5
C0005 07343 127334R      JMP ESTR5,1
C006**
C007*** CALL ADD **
C008**
C009 07344 017143R EFAD  JSB BINOP
C010 07345 017403R      JSB .FAD.
C011 07346 007152R      DEF BIN02
C012 07347 027771R      JMP FORM0
C013**
C014*** CALL SUBTRACT **
C015**
C016 07350 017143R EFSB  JSB BINOP
C017 07351 017412R      JSB .FSB.
C018 07352 007152R      DEF BIN02
C019 07353 027771R      JMP FORM0
C020**
C021*** CALL MULTIPLY **
C022**
C023 07354 017143R EFMP  JSB BINOP
C024 07355 017421R      JSB .FMP.
C025 07356 007152R      DEF BIN02
C026 07357 027771R      JMP FORM0
C027**
C028*** CALL DIVIDE **
C029**
C030 07360 017143R EFDV  JSB BINOP
C031 07361 017430R      JSB .FDV.
C032 07362 007152R      DEF BIN02
C033 07363 027771R      JMP FORM0
C034**
C035*** EXECUTE ^ **
C036**
C037 07364 165030R EPWR  LDB HSTPT,I  LOAD
C038 07365 077130R      STB TMP2
C039 07366 017364R      JSB F/PAK      POWER
C040 07367 015130R      DEF TMP2
C041 07370 017160R      JSB IFIX
C042 07371 027374R      JMP *+3
C043 07372 102301      SOS      INTEGER?
C044 07373 027406R      JMP EPWR1      YES
C045 07374 017143R      JSB BINOP      NO
C046 07375 017464R RPWR  JSB PCHK      CHECK ARGUMENTS
C047 07376 002020      SSA      NEGATIVE BASE?
C048 07377 015274R      JSB ERROR      YES
C049 07400      BASER EQU *
C050 07400 067151R      LDB BIN01      NO, LOAD BASE
C051 07401 115067R      JSB .LOGA,I  TAKE NATURAL LOG
C052 07402 017421R      JSB .FMP.      MULTIPLY BY POWER
C053 07403 007152R      DEF BIN02

```

|         |                           |         |                 |                           |
|---------|---------------------------|---------|-----------------|---------------------------|
| C054    | 07404                     | 017206R | JSB .EXP        | EXPONENTIATE              |
| C055    | 07405                     | 027771R | JMP FORM0       | RESULT                    |
| C056    | 07406                     | 077463R | EPWR1 STB TT1   | SAVE SIGN                 |
| C057    | 07407                     | 005020  | SSB             | SAVE                      |
| C058    | 07410                     | 007004  | CMB, INB        | ABSOLUTE VALUE            |
| C059    | 07411                     | 077464R | STB TT2         | OF POWER                  |
| C060    | 07412                     | 017143R | JSB BIN0P       |                           |
| C061    | 07413                     | 017464R | IPWR JSB PCHK   | CHECK ARGUMENTS           |
| C062    | 07414                     | 067151R | LDB BIN01       | STORE                     |
| C063    | 07415                     | 073151R | STA BIN01       |                           |
| C064    | 07416                     | 077152R | STB BIN02       | BASE                      |
| C065    | 07417                     | 062261R | LDA HONE        | INITIALIZE                |
| C066    | 07420                     | 072051R | STA TT3         | RESULT                    |
| C067    | 07421                     | 060055  | LDA .2          | TO                        |
| C068    | 07422                     | 072052R | STA TT4         | 1.0                       |
| C069    | 07423                     | 067464R | IPWR1 LDB TT2   | DIVIDE POWER              |
| C070    | 07424                     | 004031  | SLB, BRS        | BY 2                      |
| C071    | 07425                     | 027444R | JMP IPWR3       | WAS ODD                   |
| C072    | 07426                     | 077464R | STB TT2         | WAS EVEN                  |
| C073    | 07427                     | 005002  | IPWR2 SZB       | ZERO?                     |
| C074    | 07430                     | 027455R | JMP IPWR4       | NO                        |
| C075    | 07431                     | 063463R | LDA TT1         | YES                       |
| C076    | 07432                     | 002020  | SSA             | POSITIVE POWER?           |
| C077    | 07433                     | 027437R | JMP IPWR5       | NO                        |
| C078    | 07434                     | 062051R | LDA TT3         | YES, LOAD                 |
| C079    | 07435                     | 065052R | LDB TT4         | RESULT                    |
| C080    | 07436                     | 027771R | JMP FORM0       |                           |
| C081    | 07437                     | 062261R | IPWR5 LDA HONE  | LOAD                      |
| C082    | 07440                     | 064055  | LDB .2          | 1.0                       |
| C083    | 07441                     | 015004X | JSB .FDV        | DIVIDE BY                 |
| C084    | 07442                     | 000051R | DEF TT3         | RESULT                    |
| C085    | 07443                     | 027771R | JMP FORM0       |                           |
| C086    | 07444                     | 077464R | IPWR3 STB TT2   | SAVE POWER                |
| C087    | 07445                     | 063151R | LDA BIN01       | LOAD                      |
| C088    | 07446                     | 067152R | LDB BIN02       | BASE                      |
| C089    | 07447                     | 015001X | FMP TT3         | MULTIPLY BY RESULT-SO-FAR |
|         | 07450                     | 000051R |                 |                           |
| C090    | 07451                     | 072051R | STA TT3         | SAVE PARTIAL              |
| C091    | 07452                     | 075052R | STB TT4         | RESULT                    |
| C092    | 07453                     | 067464R | LDB TT2         | LOAD POWER                |
| C093    | 07454                     | 027427R | JMP IPWR2       |                           |
| C094    | 07455                     | 063151R | IPWR4 LDA BIN01 | LOAD                      |
| C095    | 07456                     | 067152R | LDB BIN02       | BASE                      |
| C096    | 07457                     | 015001X | FMP BIN01       | SQUARE IT                 |
|         | 07460                     | 007151R |                 |                           |
| C097    | 07461                     | 073151R | STA BIN01       | SAVE                      |
| C098    | 07462                     | 077152R | STB BIN02       | RESULT                    |
| C099    | 07463                     | 027423R | JMP IPWR1       |                           |
| C100**  |                           |         |                 |                           |
| C101*** | INSURE VALID OPERATION ** |         |                 |                           |
| C102**  |                           |         |                 |                           |
| C103    | 07464                     | 000000  | PCHK NOP        |                           |
| C104    | 07465                     | 077151R | STB BIN01       | LOAD                      |
| C105    | 07466                     | 073130R | STA TMP2        |                           |
| C106    | 07467                     | 063152R | LDA BIN02       |                           |

|         |              |         |                 |                          |
|---------|--------------|---------|-----------------|--------------------------|
| C107    | 07470        | 002020  | SSA             | POWER ON DISK?           |
| C108    | 07471        | 027475R | JMP PCK1        | YES                      |
| C109    | 07472        | 164000  | LDB A,1         | NO, LOAD POWER FROM CORE |
| C110    | 07473        | 063130R | LDA TMP2        |                          |
| C111    | 07474        | 027500R | JMP **4         |                          |
| C112    | 07475        | 012222R | PCK1 AND INF    |                          |
| C113    | 07476        | 017204R | JSB DREAD       | LOAD POWER FROM DISK     |
| C114    | 07477        | 064000  | LDB A           |                          |
| C115    | 07500        | 063130R | LDA TMP2        |                          |
| C116    | 07501        | 002002  | SZA             | BASE ZERO?               |
| C117    | 07502        | 027513R | JMP PCHK1       | NO                       |
| C118    | 07503        | 006003  | SZB,RSS         | YES, POWER ZERO?         |
| C119    | 07504        | 016274R | JSB ERROR       | YES                      |
| C120    | 07505        |         | POWER EQU *     |                          |
| C121    | 07505        | 006021  | SSB,RSS         | NO, POWER POSITIVE?      |
| C122    | 07506        | 027561R | JMP FALSE       | YES                      |
| C123    | 07507        | 016274R | JSB ERROR       | NO                       |
| C124    | 07510        | 062222R | ZRING LDA INF   | USE POSITIVE             |
| C125    | 07511        | 064051  | LDB M2          | INFINITY                 |
| C126    | 07512        | 027771R | JMP FORM0       |                          |
| C127    | 07513        | 006003  | PCHK1 SZB,RSS   | POWER ZERO?              |
| C128    | 07514        | 027564R | JMP TRUE        | YES, RETURN 1.0          |
| C129    | 07515        | 127464R | JMP PCHK,1      | NO                       |
| C130**  |              |         |                 |                          |
| C131*** | EXECUTE > ** |         |                 |                          |
| C132**  |              |         |                 |                          |
| C133    | 07516        | 017143R | EGTRT JSB BINOP | COMPUTE OPERAND          |
| C134    | 07517        | 017412R | JSB .FSB.       |                          |
| C135    | 07520        | 007152R | DEF BIN02       |                          |
| C136    | 07521        | 002020  | SSA             | NEGATIVE?                |
| C137    | 07522        | 027561R | JMP FALSE       | YES                      |
| C138    | 07523        | 027557R | JMP ENEQ1       | NO                       |
| C139**  |              |         |                 |                          |
| C140*** | EXECUTE < ** |         |                 |                          |
| C141**  |              |         |                 |                          |
| C142    | 07524        | 017143R | ELST JSB BINOP  | COMPUTE OPERAND          |
| C143    | 07525        | 017412R | JSB .FSB.       |                          |
| C144    | 07526        | 007152R | DEF BIN02       |                          |
| C145    | 07527        | 002020  | SSA             | NEGATIVE?                |
| C146    | 07530        | 027564R | JMP TRUE        | YES                      |
| C147    | 07531        | 027561R | JMP FALSE       | NO                       |
| C148**  |              |         |                 |                          |
| C149*** | EXECUTE = ** |         |                 |                          |
| C150**  |              |         |                 |                          |
| C151    | 07532        | 017143R | EEQL JSB BINOP  | COMPUTE OPERAND          |
| C152    | 07533        | 017412R | JSB .FSB.       |                          |
| C153    | 07534        | 007152R | DEF BIN02       |                          |
| C154    | 07535        | 002002  | EEQL1 SZA       | ZERO?                    |
| C155    | 07536        | 027561R | JMP FALSE       | NO                       |
| C156    | 07537        | 027564R | JMP TRUE        | YES                      |

```

C158**
C159*** EXECUTE >= **
C160**
C161 07540 017143R EGORE JSB BINOP      COMPUTE OPERAND
C162 07541 017412R      JSB .FSB.
C163 07542 007152R      DEF BIN02
C164 07543 002020      SSA              POSITIVE?
C165 07544 027561R      JMP FALSE      NO
C166 07545 027564R      JMP TRUE       YES
C167**
C168*** EXECUTE <= **
C169**
C170 07546 017143R ELORE JSB BINOP      COMPUTE OPERAND
C171 07547 017412R      JSB .FSB.
C172 07550 007152R      DEF BIN02
C173 07551 002020      SSA              NEGATIVE?
C174 07552 027564R      JMP TRUE       YES
C175 07553 027535R      JMP EENL1     NO
C176**
C177*** EXECUTE # **
C178**
C179 07554 017143R ENEQL JSB BINOP      COMPUTE OPERAND
C180 07555 017412R      JSB .FSB.
C181 07556 007152R      DEF BIN02
C182 07557 002002      ENEQ1 SZA       NON-ZERO?
C183 07560 027564R      JMP TRUE       YES
C184**
C185*** SET LOGICAL VALUES **
C186**
C187 07561 002400      FALSE CLA        LOAD
C188 07562 005400      CLB              ZERO
C189 07563 027771R      JMP FORM0
C190 07564 062261R TRUE  LDA HONE      LOAD
C191 07565 064055      LDB .2          ONE
C192 07566 027771R      JMP FORM0
C193**
C194*** EXECUTE UNARY - **
C195**
C196 07567 017252R EUMIN JSB STTOP      LOAD NUMBER
C197 07570 017217R      JSB ARINV      NEGATE NUMBER
C198 07571 027771R      JMP FORM0
C199**
C200*** EXECUTE LEFT BRACKET **
C201**
C202 07572 035027R ELBRC ISZ LSTPT      LOAD SUBSCRIPT COMMA
C203 07573 065201R      LDB SCCNT      INFORMATION WORD
C204 07574 017234R      JSB SLWST      STACK IT
C205 07575 017243R      JSB BHSTP      STACK
C206 07576 017321R      JSB RSCHK
C207 07577 027564R      JMP TRUE       1
C208**
C209*** EXECUTE NOT **
C210**
C211 07600 017252R ENUT JSB STTOP      LOAD OPERAND
C212 07601 002002      SZA              ZERO?

```

## EXECUTE THE PROGRAM

|       |       |         |           |        |                           |
|-------|-------|---------|-----------|--------|---------------------------|
| 0213  | 07602 | 027561R | JMP FALSE | NO     |                           |
| 0214  | 07603 | 027564R | JMP TRUE  | YES    |                           |
| 0215* |       |         |           |        |                           |
| 0216  | 07604 | 000000  | NXSN      | NOP    | EVALUATE FORMULA AND FIND |
| 0217  | 07605 | 076045R | STB       | TEMPS  | NEXT SEQUENCE NUMBER      |
| 0218  | 07606 | 015255R | JSB       | FETCH  |                           |
| 0219  | 07607 | 017160R | JSB       | IFIX   | INTEGERIZE SEQUENCE       |
| 0220  | 07610 | 000000  | NOP       |        | NUMBER                    |
| 0221  | 07611 | 060001  | LDA       | B      |                           |
| 0222  | 07612 | 127604R | JMP       | NXSN,I |                           |
| 0223* |       |         |           |        |                           |
| 0224  | 06251 |         | XSA       | END    | XEC6+2                    |

```

0226*          *****
0227*          SYMBOL TABLE SEARCH SUBROUTINE
0228*          *****
0229*
0230*          THE SUBROUTINE IS CALLED WITH THE IDENTIFIER TO BE
0231*          SEARCHED FOR IN A . THE SUBROUTINE RETURNS WITH
0232*          THE ADDRESS OF THE MATCHING ENTRY IN B OR -1 IN
0233*          B IF THERE IS NO MATCHING ENTRY
0234*          THE FOLLOWING RULES APPLY WHEN SEARCHING FOR ARRAYS
0235*
0236*          TYPE 1 (1 DIMENSION) SEARCH FOR CORRESPONDING TYPE 1
0237*          OR TYPE 3 ARRAY. IF TYPE 3 IS FOUND CHANGE THE ENTRY
0238*          TYPE TO TYPE 1
0239*
0240*          TYPE 2 (2 DIMENSIONS) SEARCH FOR CORRESPONDING TYPES
0241*          OR TYPE 3 ARRAY. IF TYPE 3 IS FORND CHANGE THE ENTRY
0242*          TYPE TO TYPE 2
0243*
0244*          TYPE 3 (UNDIMENSIONED) SEARCH FOR CORRESPONDING
0245*          TYPE 3 OR TYPE 1 OR TYPE 2 ARRAY
0246*
0247 07613 000000 SSYMT NOP
0248 07614 072051R STA STEMP      STORE IDENTIFIER
0249 07615 010062 AND .7      ISULATE IDENTIFIER TYPE ::
0250 07616 040047 ADA M4
0251 07617 002024 SSA,INA
0252 07620 027624R JMP *+4      JUMP IF ARRAY TYPE
0253 07621 062051R LDA STEMP      RESTORE A
0254 07622 070001 STA 1        STORE IN B
0255 07623 027636R JMP SYMT1+3
0256 07624 002020 SSA          SKIP IF UNDIMENSIONED
0257 07625 027633R JMP SYMT1
0258 07626 062051R LDA STEMP      RESTORE A
0259 07627 010044 AND MSK3     177771B SET TYPE TO 1
0260 07630 070001 STA 1
0261 07631 005004 INB          SET TYPE IN B TO 2
0262 07632 027636R JMP *+4
0263 07633 007400 SYMT1 CCB      SET DIMENSIONED FLAG IN B
0264 07634 060056 LDA .5
0265 07635 032051R IOR STEMP      SET TYPE TO UNDEFINED
0266 07636 072052R STA STEMP+1    STORE A
0267 07637 075053R STB STEMP+2    STORE B
0268 07640 066010R LDB SYMTF      START OF SYMBOL TABLE
0269 07641 027662R JMP SYMT4
0270 07642 160001 SYMT2 LDA 1,1    PICK UP 1ST WORD OF ENTRY
0271 07643 052051R CPA STEMP      COMPARE WITH IDENTIFIER
0272 07644 127613R JMP SSYMT,1    MATCH ? RETURN
0273 07645 052052R CPA STEMP+1    COMPARE WITH DIFFERENT DIM.
0274 07646 027667R JMP SYMT3
0275 07647 052053R CPA STEMP+2    COMPARE WITH DIFFERENT DIM.
0276 07650 027667R JMP SYMT3
0277 07651 160001 LDA 1,1
0278 07652 010062 AND .7      ISULATE ENTRY TYPE ::
0279 07653 050062 CPA .7      FUNCTION
0280 07654 027661R JMP *+5      YES

```

|      |       |         |                 |                                 |
|------|-------|---------|-----------------|---------------------------------|
| C281 | 07655 | 040047  | ADA M4          |                                 |
| C282 | 07656 | 002020  | SSA             | ARRAY ?                         |
| C283 | 07657 | 005004  | INB             | YES INCREMENT POINTER           |
| C284 | 07660 | 005004  | INB             | INCREMENT POINTER               |
| C285 | 07661 | 044055  | ADB .2          | ADD 2 TO POINTER                |
| C286 | 07662 | 055011R | SYM14 CPB SYMTA | SYMBOL TABLE EXHAUSTED?         |
| C287 | 07663 | 007401  | CCB, RSS        | YES                             |
| C288 | 07664 | 027642R | JMP SYMT2       | NO, CHECK NEXT ENTRY FOR MATCH  |
| C289 | 07665 | 062051R | LDA STEMP       | RETRIEVE SYMBOL                 |
| C290 | 07666 | 127613R | JMP SSYMT, I    | RETURN WITH B NEGATIVE          |
| C291 | 07667 | 062051R | SYM13 LDA STEMP | RESTORE A                       |
| C292 | 07670 | 035053R | ISZ STEMP+2     | DIMENSIONED IDENTIFIER?         |
| C293 | 07671 | 002001  | RSS             | NO, SKIP                        |
| C294 | 07672 | 170001  | STA 1, I        | YES CHANGE 1ST WORD OF ENTRY TO |
| C295 | 07673 | 127613R | JMP SSYMT, I    | APPROPRIATE DIMENSION TYPE      |

C297\*\*

C298\*\*\* ERROR TABLE \*\*

C299\*\*

|      |       |         |     |             |                                  |
|------|-------|---------|-----|-------------|----------------------------------|
| C300 | 07674 | 000071R | ERR | DEF EOF+1   | PREMATURE STATEMENT END          |
| C301 | 07675 | 001643R |     | DEF RILE    | INPUT EXCEEDS 71 CHARACTERS      |
| C302 | 07676 | 001705R |     | DEF INVSC   | SYSTEM COMMAND NOT RECOGNIZED    |
| C303 | 07677 | 002202R |     | DEF SYNE1   | NO STATEMENT TYPE FOUND          |
| C304 | 07700 | 000532R |     | DEF NUMER+1 | BAD EXPONENT PART                |
| C305 | 07701 | 002662R |     | DEF SYE16   | NO LETTER WHERE EXPECTED         |
| C306 | 07702 | 002317R |     | DEF SYNE2   | LET STATEMENT HAS NO STORE       |
| C307 | 07703 | 002332R |     | DEF SYNE3   | ILLEGAL COM STATEMENT            |
| C308 | 07704 | 002357R |     | DEF SYNE4+1 | NO FUNCTION IDENTIFIER (OR BAD)  |
| C309 | 07705 | 002371R |     | DEF SYNE5   | MISSING PARAMETER                |
| C310 | 07706 | 002376R |     | DEF SYNE6+1 | MISSING ASSIGNMENT OPERATOR      |
| C311 | 07707 | 002423R |     | DEF SYNE7   | MISSING 'THEN'                   |
| C312 | 07710 | 002447R |     | DEF SYNE8+1 | MISSING OR IMPROPER FOR-VARIABLE |
| C313 | 07711 | 002461R |     | DEF SYNE9   | MISSING 'TO'                     |
| C314 | 07712 | 002474R |     | DEF SYE10   | BAD 'STEP' PART IN FOR STATEMENT |
| C315 | 07713 | 001122R |     | DEF CALER   | CALLED ROUTINE DOES NOT EXIST    |
| C316 | 07714 | 002543R |     | DEF SYE11+1 | WRONG NUMBER OF CALL PARAMETERS  |
| C317 | 07715 | 000427R |     | DEF SYE12   | NO CONSTANT WHERE EXPECTED       |
| C318 | 07716 | 002565R |     | DEF SYE13   | NO VARIABLE WHERE EXPECTED       |
| C319 | 07717 | 002617R |     | DEF SYE14   | NO CLOSING QUOTE FOR STRING      |
| C320 | 07720 | 002631R |     | DEF SYE15   | PRINT JUXTAPOSES FORMULAS        |
| C321 | 07721 | 002675R |     | DEF SYE17   | IMPROPER WORD IN MAT STATEMENT   |
| C322 | 07722 | 002706R |     | DEF SYE18   | NO COMMA WHERE EXPECTED          |
| C323 | 07723 | 002761R |     | DEF SYE19   | IMPROPER ARRAY FUNCTION          |
| C324 | 07724 | 003001R |     | DEF SYE20   | NO SUBSCRIPT WHERE EXPECTED      |
| C325 | 07725 | 003013R |     | DEF SYE21   | ARRAY INVERSION INTO SELF        |
| C326 | 07726 | 003024R |     | DEF SYE22   | MISSING MULTIPLICATION OPERATOR  |
| C327 | 07727 | 003045R |     | DEF SYE23   | IMPROPER ARRAY OPERATOR          |
| C328 | 07730 | 003064R |     | DEF SYE24+1 | ARRAY MULTIPLICATION INTO SELF   |
| C329 | 07731 | 003206R |     | DEF FSCE1+1 | MISSING LEFT PARENTHESIS         |
| C330 | 07732 | 003262R |     | DEF FSCE2+1 | MISSING RIGHT PARENTHESIS        |
| C331 | 07733 | 003312R |     | DEF FSCE3+1 | UNRECOGNIZED OPERAND             |



|      |       |         |                             |                                      |
|------|-------|---------|-----------------------------|--------------------------------------|
| 0352 | 07734 | 003540R | DEF ARRE1                   | MISSING SUBSCRIPT                    |
| 0353 | 07735 | 003553R | DEF ARRE2                   | MISSING ARRAY IDENTIFIER             |
| 0354 | 07736 | 004374R | DEF SYE25+1                 | MISSING OR BAD INTEGER               |
| 0355 | 07737 | 000072R | DEF NOEOF+1                 | CHARACTERS AFTER STATEMENT END       |
| 0356 | 07740 | 003406R | DEF FSCE4+1                 | OUT OF CORE DURING SYNTAX            |
| 0357 | 07741 | 001754R | DEF PRERR                   | PHOTO READER NOT READY               |
| 0358 | 07742 | 005454R | DEF MER4                    | FUNCTION MULTIPLY DEFINED            |
| 0359 | 07743 | 005565R | DEF MER6                    | UNMATCHED FOR STATEMENT              |
| 0360 | 07744 | 005423R | DEF MER3                    | UNMATCHED NEXT                       |
| 0361 | 07745 | 005671R | DEF MER8                    | OUT OF STORAGE-SYMBOL TABLE          |
| 0362 | 07746 | 005720R | DEF MSYM                    | INCONSISTENT DIMENSIONS              |
| 0363 | 07747 | 005442R | DEF MLOP6                   | LAST STATEMENT IS NOT 'END'          |
| 0364 | 07750 | 005551R | DEF MERS                    | ARRAY DOUBLE DIMENSIONED             |
| 0365 | 07751 | 005603R | DEF MER10                   | NO OF DIMENSIONS UNSPECIFIED         |
| 0366 | 07752 | 001144R | DEF MER9                    | ARRAY TOO LARGE                      |
| 0367 | 07753 | 005640R | DEF MER7                    | OUT OF STORAGE-ARRAY ALLOCATION      |
| 0368 | 07754 | 007222R | DEF E6                      | SUBSCRIPT TOO LARGE                  |
| 0369 | 07755 | 001303R | DEF E8                      | UNDEFINED OPERAND ACCESSED           |
| 0370 | 07756 | 007400R | DEF BASER                   | NEGATIVE BASE POWERED TO REAL        |
| 0371 | 07757 | 007505R | DEF POWER                   | ZERO TO ZERO POWER                   |
| 0372 | 07760 | 005246R | DEF XECS                    | MISSING STATEMENT                    |
| 0373 | 07761 | 005570R | DEF E2                      | GOSUBS NESTED 10 DEEP                |
| 0374 | 07762 | 005574R | DEF E3                      | RETURN FINDS NO ADDRESS              |
| 0375 | 07763 | 005333R | DEF E4                      | OUT OF DATA                          |
| 0376 | 07764 | 001241R | DEF E1+1                    | OUT OF STORAGE - EXECUTION           |
| 0377 | 07765 | 012000R | DEF E7                      | RE-DIMENSIONED ARRAY TOO LARGE       |
| 0378 | 07766 | 012067R | DEF LERR+1                  | DIMENSIONS NOT COMPATIBLE            |
| 0379 | 07767 | 012131R | DEF LCHK5                   | MATRIX UNASSIGNED                    |
| 0380 | 07770 | 012670R | DEF LDUM1                   | NEARLY SINGULAR MATRIX               |
| 0381 | 07771 | 010425R | DEF TRGER                   | ARGUMENT TOO LARGE                   |
| 0382 | 07772 | 010776R | DEF SQRER                   | SQRT HAS NEGATIVE ARGUMENT           |
| 0383 | 07773 | 011104R | DEF LOGER                   | LOG OF NEGATIVE ARGUMENT             |
| 0384 | 07774 |         | RCERR EQU *                 | ** RECOVERABLE ERRORS FOLLOW **      |
| 0385 | 07774 | 000727R | DEF OVRER                   | OVERFLOW                             |
| 0386 | 07775 | 000725R | DEF UNDER                   | UNDERFLOW                            |
| 0387 | 07776 | 011156R | DEF LNZR                    | LOG OF ZERO                          |
| 0388 | 07777 | 011312R | DEF EXPER                   | EXPONENTIAL OVERFLOW                 |
| 0389 | 10000 | 000000  | NOP                         |                                      |
| 0390 | 10001 | 007510R | DEF ZRING                   | ZERO TO NEGATIVE POWER               |
| 0391 | ***** |         | RECOVERABLE ERROR END ***** |                                      |
| 0392 | 10002 | 007003R | DEF WRERR                   |                                      |
| 0393 | 10003 | 001546R | DEF NOCOR                   | OUT OF CORE DURING BUFFER ALLOCATION |
| 0394 | 10004 | 015075R | DEF DIA1                    | INVALID DISK ADDR                    |
| 0395 | 10005 | 002435R | DEF SYE1                    | INVALID COND. EXECUTABLE STATEMENT   |
| 0396 | 10006 | 002042R | DEF NOFIL                   | FILE NOT ON DISK                     |
| 0397 | *     |         |                             |                                      |
| 0398 | *     |         |                             |                                      |
| 0399 | 10007 | 005412  | EBUFF OCT 6412              |                                      |
| 0400 | 10010 | 042522  | ASC 5,ERROR                 |                                      |
|      | 10011 | 051117  |                             |                                      |
|      | 10012 | 051040  |                             |                                      |
| 0401 | 10013 | 000000  | EBFF BSS 2                  |                                      |
| 0402 | 10015 | 029111  | LBUFF ASC 5, IN LINE        |                                      |
|      | 10016 | 047040  |                             |                                      |
|      | 10017 | 045111  |                             |                                      |

PAGE 0108 #15  
EXECUTE THE PROGRAM

4:49 PM SUN., 11 MAR., 1979

|      |       |        |             |
|------|-------|--------|-------------|
|      | 10020 | 047105 |             |
|      | 10021 | 020040 |             |
| 0383 | 10022 | 000000 | LNBFF BSS 5 |

C385\*\*

C386\*\*\* PREDEFINED FUNCTION JUMP TABLE \*\*

C387\*\*

|      |       |         |      |     |      |
|------|-------|---------|------|-----|------|
| C388 | 10025 | 007036R | PDFT | DEF | ETAB |
| C389 | 10026 | 010654R |      | DEF | ESIN |
| C390 | 10027 | 010652R |      | DEF | ECUS |
| C391 | 10030 | 010413R |      | DEF | ETAN |
| C392 | 10031 | 010537R |      | DEF | EATN |
| C393 | 10032 | 011204R |      | DEF | EEXP |
| C394 | 10033 | 011075R |      | DEF | ELUG |
| C395 | 10034 | 010647R |      | DEF | EABS |
| C396 | 10035 | 010772R |      | DEF | ESQR |
| C397 | 10036 | 011062R |      | DEF | EINT |
| C398 | 10037 | 010743R |      | DEF | ERND |
| C399 | 10040 | 011173R |      | DEF | ESGN |

C400\*\*

C401\*\*\* OUTPUT A NUMBER \*\*

C402\*\*

|      |       |         |       |           |                       |
|------|-------|---------|-------|-----------|-----------------------|
| C403 | 10041 | 000000  | NUMOT | NCP       | NUMBER IN (A) AND (B) |
| C404 | 10042 | 073366R |       | STA EXPON | SAVE NUMBER           |
| C405 | 10043 | 002041  |       | SEZ,RSS   | SIGN?                 |
| C406 | 10044 | 025056R |       | JMP NS2   | NO                    |
| C407 | 10045 | 002021  |       | SSA,RSS   | YES, NEGATIVE NUMBER? |
| C408 | 10046 | 025053R |       | JMP NS1   | NO                    |
| C409 | 10047 | 017217R |       | JSB ARINV | YES, INVERT IT        |
| C410 | 10050 | 073366R |       | STA EXPON |                       |
| C411 | 10051 | 062150R |       | LDA .45   |                       |
| C412 | 10052 | 002001  |       | RSS       |                       |
| C413 | 10053 | 062141R | NS1   | LDA .32   | STORE                 |
| C414 | 10054 | 072041R |       | STA SIGN  | SIGN                  |
| C415 | 10055 | 063366R |       | LDA EXPON |                       |
| C416 | 10056 | 076351R | NS2   | STB GETDG | SAVE NUMBER           |
| C417 | 10057 | 017160R |       | JSB IFIX  | INTEGERIZE            |
| C418 | 10060 | 000000  |       | NCP       |                       |
| C419 | 10061 | 102201  |       | SOC       | WAS IT AN INTEGER?    |
| C420 | 10062 | 025113R |       | JMP NUM02 | NO                    |

C421\*\*

C422\*\*\* OUTPUT AN INTEGER \*\*

C423\*\*

|      |       |         |  |             |                |
|------|-------|---------|--|-------------|----------------|
| C424 | 10063 | 002400  |  | CLA         | SAVE           |
| C425 | 10064 | 075062R |  | STB B1+1    | INTEGER        |
| C426 | 10065 | 045255R |  | ADB B1000   | 5 OR MORE      |
| C427 | 10066 | 006021  |  | SSB,RSS     | CHARACTERS?    |
| C428 | 10067 | 040056  |  | ADA .3      | YES            |
| C429 | 10070 | 040061  |  | ADA .6      | COMPUTE        |
| C430 | 10071 | 042020R |  | ADA CCNT    | END-OF-FIELD   |
| C431 | 10072 | 003004  |  | CMA,INA     | SAVE MARKER TO |
| C432 | 10073 | 072060R |  | STA MLBX1+1 | END-OF-FIELD   |
| C433 | 10074 | 065272R |  | LDB PARM    |                |
| C434 | 10075 | 006021  |  | SSB,RSS     |                |
| C435 | 10076 | 025102R |  | JMP *+4     |                |
| C436 | 10077 | 042132R |  | ADA .21     |                |
| C437 | 10100 | 002020  |  | SSA         |                |
| C438 | 10101 | 027002R |  | JMP WRERR-1 |                |
| C439 | 10102 | 042164R |  | ADA .74     | ENOUGH         |

|                                           |       |         |                 |                                  |
|-------------------------------------------|-------|---------|-----------------|----------------------------------|
| 0440                                      | 10103 | 002020  | SSA             | ROOM?                            |
| 0441                                      | 10104 | 017461R | JSB OUTLN       |                                  |
| 0442                                      | 10105 | 062041R | LDA SIGN        |                                  |
| 0443                                      | 10106 | 002002  | SZA             | SIGN?                            |
| 0444                                      | 10107 | 017477R | JSB OUTCR       | YES, OUTPUT IT                   |
| 0445                                      | 10110 | 062062R | LDA 31+1        | OUTPUT                           |
| 0446                                      | 10111 | 017132R | JSB OUTIN       | THE INTEGER                      |
| 0447                                      | 10112 | 126041R | JMP NUMOT,I     |                                  |
| 0448                                      | 10113 | 003400  | NUMO2 CCA       | SET 'FIXED'                      |
| 0449                                      | 10114 | 073037R | STA FFLAG       | FLAG FALSE                       |
| 0450                                      | 10115 | 063366R | LDA EXPON       | LOAD                             |
| 0451                                      | 10116 | 066351R | LDB GETDG       | NUMBER                           |
| 0452                                      | 10117 | 016002X | FAD MAXFX       | IS NUMBER LESS THAN              |
|                                           | 10120 | 000265R |                 |                                  |
| 0453                                      | 10121 | 002021  | SSA,RSS         | 999999.5 ?                       |
| 0454                                      | 10122 | 026132R | JMP NUMO5       | NO                               |
| 0455                                      | 10123 | 063366R | LDA EXPON       | YES, IS                          |
| 0456                                      | 10124 | 066351R | LDB GETDG       | NUMBER                           |
| 0457                                      | 10125 | 016002X | FAD MINFX       | LESS THAN                        |
|                                           | 10126 | 009267R |                 |                                  |
| 0458                                      | 10127 | 056127R | LDB .12         | 0.09999995?                      |
| 0459                                      | 10130 | 002021  | SSA,RSS         |                                  |
| 0460                                      | 10131 | 037037R | ISZ FFLAG       | NO, SET FFLAG = 0 AND SKIP       |
| 0461                                      | 10132 | 064070  | NUMO5 LDB .15   | YES, LOAD 'FLOATING' FIELD WIDTH |
| 0462                                      | 10133 | 046020R | ADB CCNT        | SAVE                             |
| 0463                                      | 10134 | 007004  | CMB,INB         | END-OF-FIELD                     |
| 0464                                      | 10135 | 076060R | STB MLBX1+1     | MARKER                           |
| 0465                                      | 10136 | 046165R | ADB .75         | ROOM                             |
| 0466                                      | 10137 | 006020  | SSB             | ENOUGH?                          |
| 0467                                      | 10140 | 017461R | JSB OUTLN       |                                  |
| 0468**                                    |       |         |                 |                                  |
| 0469*** OUTPUT A FLOATING POINT NUMBER ** |       |         |                 |                                  |
| 0470**                                    |       |         |                 |                                  |
| 0471                                      | 10141 | 063366R | LDA EXPON       |                                  |
| 0472                                      | 10142 | 073066R | STA MANT1       |                                  |
| 0473                                      | 10143 | 066351R | LDB GETDG       | UNPACK                           |
| 0474                                      | 10144 | 017223R | JSB .FLUN       |                                  |
| 0475                                      | 10145 | 077130R | STB MANT2       | NUMBER                           |
| 0476                                      | 10146 | 072042R | STA EXP         |                                  |
| 0477                                      | 10147 | 062041R | LDA SIGN        |                                  |
| 0478                                      | 10150 | 002002  | SZA             | SIGN?                            |
| 0479                                      | 10151 | 017477R | JSB OUTCR       | YES, OUTPUT IT                   |
| 0480                                      | 10152 | 002400  | CLA             | INITIALIZE COUNTER               |
| 0481                                      | 10153 | 073366R | STA EXPON       | FOR DECIMAL EXPONENT             |
| 0482                                      | 10154 | 052042R | CPA EXP         | EXPONENT ZERO?                   |
| 0483                                      | 10155 | 026200R | JMP EOUT4       | YES                              |
| 0484                                      | 10156 | 016777R | EOUT2 JSB MBY10 | NO,                              |
| 0485                                      | 10157 | 062042R | LDA EXP         | MULTIPLY                         |
| 0486                                      | 10160 | 003004  | CMA,INA         | NUMBER BY 10                     |
| 0487                                      | 10161 | 002020  | SSA             | UNTIL                            |
| 0488                                      | 10162 | 026165R | JMP *+3         | IT IS                            |
| 0489                                      | 10163 | 037366R | ISZ EXPON       | GREATER                          |
| 0490                                      | 10164 | 026156R | JMP EOUT2       | THAN 1                           |
| 0491                                      | 10165 | 017030R | JSB DBY10       | DIVIDE BY 10                     |
| 0492                                      | 10166 | 063366R | LDA EXPON       |                                  |

|      |       |         |       |             |                        |
|------|-------|---------|-------|-------------|------------------------|
| 0493 | 10167 | 066042R | EOUT3 | LDB EXP     | DIVIDE                 |
| 0494 | 10170 | 007004  |       | CMB, INB    | NUMBER                 |
| 0495 | 10171 | 006021  |       | SSB, RSS    | BY 10                  |
| 0496 | 10172 | 026200R |       | JMP EOUT4   | UNTIL                  |
| 0497 | 10173 | 073366R |       | STA EXPON   | IT IS                  |
| 0498 | 10174 | 017030R |       | JSB DBY10   | LESS                   |
| 0499 | 10175 | 003400  |       | CCA         | THAN                   |
| 0500 | 10176 | 043366R |       | ADA EXPON   | 1                      |
| 0501 | 10177 | 026167R |       | JMP EOUT3   |                        |
| 0502 | 10200 | 003000  | EOUT4 | CMA         | SET EXPONENT           |
| 0503 | 10201 | 073366R |       | STA EXPON   | TO TRUE VALUE-1        |
| 0504 | 10202 | 064044  |       | LDB M7      | SET DIGIT              |
| 0505 | 10203 | 076375R |       | STB RETCR   | COUNTER                |
| 0506 | 10204 | 007400  |       | CCB         | SET DECIMAL            |
| 0507 | 10205 | 077461R |       | STB OUTLN   | POINT FLAG             |
| 0508 | 10206 | 057037R |       | CFB FFLAG   | FIXED POINT?           |
| 0509 | 10207 | 026216R |       | JMP EOUT6   | NO                     |
| 0510 | 10210 | 003000  |       | CMA         | YES, SET               |
| 0511 | 10211 | 073461R |       | STA OUTLN   | DECIMAL POINT FLAG     |
| 0512 | 10212 | 050054  |       | CPA .1      | .1?                    |
| 0513 | 10213 | 026222R |       | JMP EOUT5   | YES                    |
| 0514 | 10214 | 002021  |       | SSA, RSS    | LEADING DECIMAL POINT? |
| 0515 | 10215 | 026230R |       | JMP EOUT7+2 | YES                    |
| 0516 | 10216 | 016351R | EOUT6 | JSB GETDG   | OUTPUT                 |
| 0517 | 10217 | 042154R |       | ADA .48     | A                      |
| 0518 | 10220 | 017477R |       | JSB OUTCR   | DIGIT                  |
| 0519 | 10221 | 026232R |       | JMP EOUT8   |                        |
| 0520 | 10222 | 062152R | EOUT5 | LDA .46     | OUTPUT                 |
| 0521 | 10223 | 017477R |       | JSB OUTCR   | DECIMAL POINT          |
| 0522 | 10224 | 062154R |       | LDA .48     | OUTPUT                 |
| 0523 | 10225 | 026231R |       | JMP EOUT8-1 | LEADING ZERO           |
| 0524 | 10226 | 037461R | EOUT7 | ISZ OUTLN   | DECIMAL POINT NEXT?    |
| 0525 | 10227 | 026216R |       | JMP EOUT6   | NO                     |
| 0526 | 10230 | 062152R |       | LDA .46     | YES,                   |
| 0527 | 10231 | 017477R |       | JSB OUTCR   | OUTPUT 11              |
| 0528 | 10232 | 036375R | EOUT8 | ISZ RETCR   | MORE MANTISSA?         |
| 0529 | 10233 | 026226R |       | JMP EOUT7   | YES                    |
| 0530 | 10234 | 062020R |       | LDA CCNT    | NO,                    |
| 0531 | 10235 | 072347R |       | STA NUM01   | SAVE                   |
| 0532 | 10236 | 062017R |       | LDA BADDR   | OUTPUT                 |
| 0533 | 10237 | 072350R |       | STA NUM03   | POINTERS               |
| 0534 | 10240 | 016351R |       | JSB GETDG   | NEXT DIGIT             |
| 0535 | 10241 | 040046  |       | ADA M5      | FIVE OR                |
| 0536 | 10242 | 002020  |       | SSA         | GREATER?               |
| 0537 | 10243 | 026306R |       | JMP EOUT1   | NO                     |
| 0538 | 10244 | 003400  |       | CCA         | SET DECIMAL            |
| 0539 | 10245 | 073066R | ERND1 | STA SYMCK   | POINT COUNTER          |
| 0540 | 10246 | 016375R |       | JSB RETCR   | RETRIEVE CHARACTER     |
| 0541 | 10247 | 052152R |       | CPA .46     | DECIMAL POINT?         |
| 0542 | 10250 | 026244R |       | JMP ERND1-1 | YES, FLAG IT           |
| 0543 | 10251 | 017353R |       | JSB DIGCK   | NO, DIGIT?             |
| 0544 | 10252 | 026265R |       | JMP ERND2   | NO                     |
| 0545 | 10253 | 050064  |       | CPA .9      | YES, 9?                |
| 0546 | 10254 | 026257R |       | JMP *+3     | YES                    |
| 0547 | 10255 | 042155R |       | ADA .49     | NO, BUMP               |

|      |       |         |                 |                           |
|------|-------|---------|-----------------|---------------------------|
| 0548 | 10256 | 026301R | JMP ERND3       | DIGIT 1                   |
| 0549 | 10257 | 062154R | LDA .48         | OVERLAY                   |
| 0550 | 10260 | 017477R | JSB OUTCR       | A ZERO                    |
| 0551 | 10261 | 016375R | JSB RETCR       | BACKSPACE                 |
| 0552 | 10262 | 003400  | CCA             | DECREMENT                 |
| 0553 | 10263 | 043066R | ADA SYMCK       | DECIMAL POINT             |
| 0554 | 10264 | 025245R | JMP ERND1       | COUNTER                   |
| 0555 | 10265 | 017477R | ERND2 JSB OUTCR | RESTORE CHARACTER         |
| 0556 | 10266 | 037366R | ISZ EXPON       | CORRECT                   |
| 0557 | 10267 | 000000  | NOP             | EXPONENT                  |
| 0558 | 10270 | 062155R | LDA .49         | OVERLAY A 1               |
| 0559 | 10271 | 067037R | LDB FFLAG       | FIXED                     |
| 0560 | 10272 | 006002  | SZB             | POINT?                    |
| 0561 | 10273 | 026301R | JMP ERND3       | NO                        |
| 0562 | 10274 | 017477R | JSB OUTCR       | YES, OUTPUT CHARACTER     |
| 0563 | 10275 | 062154R | LDA .48         | PREPARE TO OVERLAY A ZERO |
| 0564 | 10276 | 037066R | ISZ SYMCK       | DECIMAL POINT NEXT?       |
| 0565 | 10277 | 026274R | JMP *-3         | NO                        |
| 0566 | 10300 | 062152R | LDA .46         | YES                       |
| 0567 | 10301 | 017477R | ERND3 JSB OUTCR | RESTORE                   |
| 0568 | 10302 | 062347R | LDA NUM01       | OUTPUT                    |
| 0569 | 10303 | 072020R | STA CCNT        | POINTERS                  |
| 0570 | 10304 | 062350R | LDA NUM03       |                           |
| 0571 | 10305 | 072017R | STA BADDR       |                           |
| 0572 | 10306 | 037037R | EOUT1 ISZ FFLAG | NO, FIXED POINT?          |
| 0573 | 10307 | 025336R | JMP EOUT9       | YES                       |
| 0574 | 10310 | 062161R | LDA E           | NO,                       |
| 0575 | 10311 | 017477R | JSB OUTCR       | OUTPUT 'E'                |
| 0576 | 10312 | 062150R | LDA .45         | LOAD '--'                 |
| 0577 | 10313 | 067366R | LDB EXPON       | POSITIVE                  |
| 0578 | 10314 | 005020  | SSB             | EXPONENT?                 |
| 0579 | 10315 | 007005  | CMB, INB, RSS   | NO                        |
| 0580 | 10316 | 062147R | LDA .43         | YES, LOAD '+'             |
| 0581 | 10317 | 077366R | STB EXPON       |                           |
| 0582 | 10320 | 017477R | JSB OUTCR       | OUTPUT SIGN               |
| 0583 | 10321 | 067366R | LDB EXPON       |                           |
| 0584 | 10322 | 062154R | LDA .48         | COMPUTE                   |
| 0585 | 10323 | 044041  | ADB M10         |                           |
| 0586 | 10324 | 005020  | SSB             | EXPONENT                  |
| 0587 | 10325 | 025330R | JMP *+3         |                           |
| 0588 | 10326 | 002004  | INA             | DIGIT                     |
| 0589 | 10327 | 025323R | JMP *-4         |                           |
| 0590 | 10330 | 045157R | ADB .58         | COMPUTE                   |
| 0591 | 10331 | 077366R | STB EXPON       | SECOND DIGIT              |
| 0592 | 10332 | 017477R | JSB OUTCR       | OUTPUT                    |
| 0593 | 10333 | 063366R | LDA EXPON       |                           |
| 0594 | 10334 | 017477R | JSB OUTCR       | EXPONENT                  |
| 0595 | 10335 | 125041R | JMP NUM01, I    |                           |
| 0596 | 10336 | 016375R | EOUT9 JSB RETCR | RETRIEVE CHARACTER        |
| 0597 | 10337 | 052154R | CFA .48         | ZERO?                     |
| 0598 | 10340 | 025343R | JMP EOU10       | YES                       |
| 0599 | 10341 | 017477R | JSB OUTCR       | NO, RESTORE CHARACTER     |
| 0600 | 10342 | 125041R | JMP NUM01, I    |                           |
| 0601 | 10343 | 062141R | EOU10 LDA .32   | OVERLAY                   |
| 0602 | 10344 | 017477R | JSB OUTCR       | A BLANK                   |

EXECUTE THE PROGRAM

|      |       |         |             |           |
|------|-------|---------|-------------|-----------|
| 0603 | 10345 | 015375R | JSB RETCR   | BACKSPACE |
| 0604 | 10346 | 025336R | JMP EOUT9   |           |
| 0605 | 10347 | 000000  | NUM01 BSS 1 |           |
| 0606 | 10350 | 000000  | NUM03 BSS 1 |           |

```

C608**
C609*** GET DIGIT TO OUTPUT **
C610**
C611 10351 000000 GETDG NOP
C612 10352 015777R JSB MBY10 MULTIPLY BY 10
C613 10353 065042R LDB EXP GET EXPONENT IN (B)
C614 10354 007004 CMB,INB AS NEGATIVE
C615 10355 012230R AND HIMSK KEEP 5 HIGH BITS OF (A)
C616 10356 001200 RAL NORMALIZE TO BIT 15
C617 10357 005024 SSB,INB ROTATE INTEGER
C618 10360 025356R JMP *-2 INTO (A)
C619 10361 010074 AND MSK0 EXTRACT
C620 10362 072430R STA NUMCK DIGIT
C621 10363 065042R LDB EXP ROTATE
C622 10364 007004 CMB,INB
C623 10365 001300 RAR BACK
C624 10366 005024 SSB,INB
C625 10367 025356R JMP *-2
C626 10370 023066R XOR MANT1 REMOVE
C627 10371 067130R LDB MANT2 DIGIT
C628 10372 015742R JSB NORML NORMALIZE REMAINDER
C629 10373 062430R LDA NUMCK LOAD (A) WITH DIGIT
C630 10374 125351R JMP GETDG,I
C631**
C632*** RETRIEVE CHARACTER FROM OUTPUT BUFFER **
C633**
C634 10375 000000 RETCR NOP
C635 10376 065020R LDB CCNT DECREMENT
C636 10377 044052 ADB M1 CHARACTER
C637 10400 075020R STB CCNT COUNT
C638 10401 162017R LDA BADDR,I POSITION
C639 10402 005011 SLB,RSS AND
C640 10403 001727 ALF,ALF EXTRACT
C641 10404 010074 AND MSK0 CHARACTER
C642 10405 004010 SLB FIRST CHARACTER OF WORD?
C643 10406 125375R JMP RETCR,I NO
C644 10407 065017R LDB BADDR YES, DECREMENT
C645 10410 044052 ADB M1 BUFFER
C646 10411 075017R STB BADDR POINTER
C647 10412 125375R JMP RETCR,I
C648*
C649*

```



```

0651*          *****
0652*          SUBROUTINE TO CALCULATE TAN(X)
0653*          *****
0654*
0655*          CALLED BY A JMP ETAN WITH THE ARGUMENT
0656*          IN FLOATING RADIAN IN THE REGISTERS.
0657*          THE FLOATING RESULT IS RETURNED IN A & B
0658*
0659 10413 016001X ETAN FMP FUPI
          10414 010502R
0660 10415 072506R STA XTEMP
0661 10416 075507R STB XTEMP+1
0662 10417 016002X FAD K1
          10420 010504R
0663 10421 017445R JSB .PWR2
0664 10422 177776 DEC -2
0665 10423 017420R JSB .IENT
0666 10424 016274R JSB ERROR
0667 10425 017437R TRGER JSB FLOAT
0668 10426 017217R JSB ARINV
0669 10427 017445R JSB .PWR2
0670 10430 000002 DEC 2
0671 10431 016002X FAD XTEMP
          10432 010506R
0672 10433 072506R STA XTEMP
0673 10434 075507R STB XTEMP+1 X=X-4*ENTIER((X+1)/4)
0674 10435 016003X FSB K1
          10436 010504R
0675 10437 073037R STA SBUX TEMPURARY
0676 10440 002020 SSA X<1?
0677 10441 026474R JMP ELSE1 YES
0678 10442 062514R LDA K2 NO
0679 10443 065515R LDB K2+1
0680 10444 016003X FSB XTEMP
          10445 010506R
0681 10446 072510R BOTH1 STA YTEMP
0682 10447 075511R STB YTEMP+1 Y= 2-X
0683 10450 016001X FMP YTEMP
          10451 010510R
0684 10452 016001X FMP K2
          10453 010514R
0685 10454 016003X FSB K1
          10455 010504R
0686 10456 017531R JSB .CHEB
0687 10457 010516R DEF COEFF
0688 10460 016001X FMP YTEMP
          10461 010510R
0689 10462 072510R STA YTEMP
0690 10463 075511R STB YTEMP+1 Y=Y*CHEBY(2*Y**2-1)
0691 10464 063037R LDA SBUX
0692 10465 002020 SSA X<1 ?
0693 10466 026477R JMP ELSE2 YES
0694 10467 062504R LDA K1
0695 10470 065505R LDB K1+1
0696 10471 016004X FDV YTEMP

```

```

10472 010510R
0697 10473 025101R      JMP FOR12
0698 10474 062506R ELSE1 LDA XTEMP
0699 10475 065507R      LDB XTEMP+1
0700 10476 025446R      JMP BOTH1      Y=X
0701 10477 062510R ELSE2 LDA YTEMP
0702 10500 065511R      LDB YTEMP+1
0703 10501 025101R      JMP FOR12
0704*
0705 10502 050574      FUPI DEC 1.273239545      4/PI
10503 141002
0706 10504 040000      K1 DEC 1.
10505 000002
0707 10506 000000      XTEMP BSS 2
0708 10510 000000      YTEMP BSS 2
0709 10512 000000      UTEMP BSS 2
0710 10514 040000      K2 DEC 2.
10515 000004
0711 10516 075061      COEFF DEC 1.4458E-8
10517 075315
0712 10520 065034      DEC 2.013766E-7
10521 175725
0713 10522 057035      DEC 2.804816E-6
10523 030335
0714 10524 050755      DEC 3.906637E-5
10525 114745
0715 10526 043523      DEC 5.4417038E-4
10527 052355
0716 10530 075112      DEC 7.586101578E-3
10531 065763
0717 10532 065520      DEC .10675392857
10533 163773
0718 10534 070512      DEC 1.7701474227
10535 014002
0719 10536 000000      OCT 0

```

```

0721*          *****
0722*          SUBROUTINE TO CALCULATE ATN(X)
0723*          *****
0724*
0725*          CALLED BY A JMP EATN WITH THE ARGUMENT
0726*          IN FLOATING POINT FORM IN THE REGISTERS.
0727*          THE FLOATING RESULT IN THE RANGE -PI/2
0728*          TO PI/2 IS RETURNED IN A & B
0729*
0730 10537 072506R EATN  STA XTEMP
0731 10540 075507R      STB XTEMP+1
0732 10541 060001      LDA 1
0733 10542 010074      AND MSK0
0734 10543 073037R      STA SBOX          TAN = EXP OF (X)
0735 10544 002002      SZA
0736 10545 000010      SLA              ABS (X) > 1 ?
0737 10546 025603R      JMP ELS1          NO
0738 10547 062504R      LDA K1
0739 10550 065505R      LDB K1+1
0740 10551 015004X      FDV XTEMP          U=1/X
      10552 010506R
0741 10553 072512R BTH1 STA UTEMP
0742 10554 075513R      STB UTEMP+1
0743 10555 015001X      FMP UTEMP
      10556 010512R
0744 10557 015001X      FMP K2
      10560 010514R
0745 10561 015003X      FSB K1
      10562 010504R
0746 10563 017331R      JSB .CHEB
0747 10564 010622R      DEF COEF
0748 10565 015001X      FMP UTEMP
      10566 010512R
0749 10567 072510R      STA YTEMP
0750 10570 075511R      STB YTEMP+1      Y=U*CHEBY(2*U**2-1)
0751 10571 063037R      LDA SBOX
0752 10572 002002      SZA
0753 10573 000010      SLA              ABS(X)>1 ?
0754 10574 025606R      JMP ELS2          NO
0755 10575 062506R      LDA XTEMP
0756 10576 002020      SSA              X<U ?
0757 10577 025611R      JMP ELS3          YES
0758 10600 062616R      LDA PIBY2
0001 10601 065617R      LDB PIBY2+1
0002 10602 025613R      JMP ELS3+2      ANS = PI/2 - Y
0003 10603 062506R ELS1 LDA XTEMP
0004 10604 065507R      LDB XTEMP+1
0005 10605 025553R      JMP BTH1          U=X
0006 10606 062510R ELS2 LDA YTEMP
0007 10607 065511R      LDB YTEMP+1
0008 10610 025101R      JMP FOR12      ANSWER = Y
0009 10611 062620R ELS3 LDA MP2
0010 10612 065621R      LDB MP2+1
0011 10613 015003X      FSB YTEMP
      10614 010510R

```

```

0012 10615 025101R      JMP FOR12
0013*
0014 10616 062207  PIBY2 DEC 1.5707963268  PI/2
      10617 166402
0015 10620 115570  MP2   DEC -1.5707963268  -PI/2
      10621 011402
0016 10622 105671  COEF   DEC -1.33034E-8
      10623 102315
0017 10624 055335          DEC 8.64888E-8
      10625 156323
0018 10626 131601          DEC -56.99186E-8
      10627 137731
0019 10630 040033          DEC 3.821037E-6
      10631 035737
0020 10632 111013          DEC -2.6215196E-5
      10633 123343
0021 10634 060542          DEC 1.8574297E-4
      10635 060351
0022 10636 122573          DEC -1.381195004E-3
      10637 062757
0023 10640 055471          DEC .01113584206
      10641 107365
0024 10642 111620          DEC -.1058929245
      10643 147373
0025 10644 070320          DEC 1.762747174
      10645 155002
0026 10646 000000          OCT 0

```

```

0028*
0029*
0030*
0031*
0032*
0033*
0034*
0035*
0036*
0037 10647 002020  EABS  SSA      NEGATIVE?
0038 10650 017217R      JSB ARINV  YES, NEGATE IT
0039 10651 025101R      JMP FOR12

```

```

0041*          *****
0042*          SUBROUTINE TO CALCULATE SIN(X)
0043*          *****
0044*
0045*          CALLED BY A JMP ESIN WITH THE ARGUMENT
0046*          IN FLOATING RADIAN IN THE REGISTERS.
0047*          THE FLOATING RESULT IS RETURNED IN A & B
0048*
0049 10652 016002X ECUS   FAD PIBY2
      10653 010616R
0050 10654 016001X ESIN   FMP TOPI
      10655 010724R
0051 10656 072506R      STA XTEMP
0052 10657 076507R      STB XTEMP+1      X=2*X/PI
0053 10660 016002X      FAD K1
      10661 010504R
0054 10662 017445R      JSB .PWR2
0055 10663 177775      DEC -2
0056 10664 017420R      JSB .IENT
0057 10665 026424R      JMP TRGR-1      ERROR IF EXPONENT >= 15
0058 10666 017437R      JSB FLOAT
0059 10667 016001X      FMP MM4
      10670 010726R
0060 10671 016002X      FAD XTEMP
      10672 010506R
0061 10673 072506R      STA XTEMP
0062 10674 076507R      STB XTEMP+1      X=X-4*ENTIER((X+1)/4)
0063 10675 016003X      FSB K1
      10676 010504R
0064 10677 002020      SSA          X<1 ?
0065 10700 026707R      JMP PAST      YES
0066 10701 062514R      LDA K2
0067 10702 066515R      LDB K2+1
0068 10703 016003X      FSB XTEMP
      10704 010506R
0069 10705 072506R      STA XTEMP
0070 10706 076507R      STB XTEMP+1      X=2-X
0071 10707 062506R PAST  LDA XTEMP
0072 10710 066507R      LDB XTEMP+1
0073 10711 016001X      FMP XTEMP
      10712 010506R
0074 10713 017445R      JSB .PWR2
0075 10714 000001      DEC 1
0076 10715 016003X      FSB K1
      10716 010504R
0077 10717 017331R      JSB .CHEB
0078 10720 010730R      DEF COEF1
0079 10721 016001X      FMP XTEMP
      10722 010506R
0080 10723 026101R      JMP FOR12      ANS = X+CHEBY (2*X**2-1)
0081*
0082 10724 050574 TOPI  DEC .636619772      2/PI
      10725 141000
0083 10726 100000 MM4   DEC -4.
      10727 000004

```

```

C084 10730 047605 COEF1 DEC 1.18496E-6
      10731 072733
C085 10732 134143 DEC -1.365875E-4
      10733 104751
C086 10734 045261 DEC 9.118016E-3
      10735 157365
C087 10736 133371 DEC -.2852615692
      10737 014777
C088 10740 050656 DEC 2.5525579248
      10741 107004
C089 10742 000000 OCT 0

```

```

C091* *****
C092* SUBROUTINE TO COMPUTE RND(X)
C093* *****
C094*
C095* THE ARGUMENT OF RND IS A DUMMY ONE
C096* THE ROUTINE GENERATES A RANDOM NUMBER
C097* IN THE A & B REGISTERS
C098*
C099* R=X/M, X=C*X MOD M, M=2^31, C=2^15 + 3
C100*
C101 10743 002400 ERND CLA X IS INITIALLY 1
C102 10744 072042R STA EXP INITIALIZE EXPONENT
C103 10745 062043R LDA XH COMPUTE
C104 10746 001000 ALS HIGH
C105 10747 042043R ADA XH PART
C106 10750 065044R LDB XL 2*XH
C107 10751 004065 CLE,ERB + XH +
C108 10752 040001 ADA 1 XL*2^15
C109 10753 065044R LDB XL
C110 10754 005275 RBL,CLE,SLB,ERB ADD XL[15] TO
C111 10755 002004 INA (A) (FROM 2*XL)
C112 10756 004066 CLE,ELB 2*XL
C113 10757 045044R ADB XL + XL
C114 10760 001675 ELA,CLE,SLA,ERA ADD OVERFLOW
C115 10761 002104 CLE,INA TO (A)
C116 10762 045263R ADB FLGBT ADD IN TRAILING BIT OF XL*2^15
C117 10763 002040 SEZ ADD OVERFLOW
C118 10764 002004 INA TO (A)
C119 10765 001665 ELA,CLE,ERA ERASE A[15]
C120 10766 072043R STA XH STORE
C121 10767 075044R STB XL INTEGER
C122 10770 015647R JSB .PACK NORMALIZE AND PACK
C123 10771 025101R JMP FOR12

```

```

C125*          *****
C126*          SUBROUTINE TO CALCULATE SQR(X)
C127*          *****
C128*
C129*          CALLED BY A JMP ESQR WITH THE ARGUMENT
C130*          IN FLOATING POINT FORM IN THE REGISTERS.
C131*          THE FLOATING RESULT IS RETURNED IN A & B
C132*
C133 10772 002003 ESQR  SZA,RSS          X=0 ?
C134 10773 025101R      JMP FOR12        YES, ANS = 0
C135 10774 002020      SSA                X<0 ?
C136 10775 015274R      JSB ERROR        YES ERROR
C137 10776 072506R SNRER STA XTEMP
C138 10777 017223R      JSB .FLUN
C139 11000 000031      SLA,ARS          EXP(X) ODD?
C140 11001 027041R      JMP ODD
C141 11002 040052      ADA R1
C142 11003 073037R      STA SBOX          SBOX=EXP(X)/2-1
C143 11004 075507R      STB XTEMP+1      LOW MANTISSA/2
C144 11005 062506R      LDA XTEMP
C145 11006 015001X      FMP SA2
C146 11007 011054R
C146 11010 015002X      FAD SB2
C146 11011 011060R
C147 11012 072510R BTH2 STA YTEMP
C148 11013 075511R      STB YTEMP+1
C149 11014 062506R      LDA XTEMP
C150 11015 065507R      LDB XTEMP+1
C151 11016 015004X      FDV YTEMP
C151 11017 010510R
C152 11020 015002X      FAD YTEMP
C152 11021 010510R
C153 11022 017445R      JSB .PWR2
C154 11023 177777      DEC -1
C155 11024 072510R      STA YTEMP
C156 11025 075511R      STB YTEMP+1      Y=(Y+X/Y)/2
C157 11026 062506R      LDA XTEMP
C158 11027 065507R      LDB XTEMP+1
C159 11030 016004X      FDV YTEMP
C159 11031 010510R
C160 11032 015002X      FAD YTEMP
C160 11033 010510R
C161 11034 072510R      STA YTEMP
C162 11035 075511R      STB YTEMP+1
C163 11036 017445R      JSB .PWR2
C164 11037 000000 SBOX OCT 0
C165 11040 025101R      JMP FOR12        ANS = (P+F/P)*2**SBOX
C166 11041 073037R ODD  STA SBOX        SBOX = EXP(X)/2
C167 11042 044074      ADB MSK0
C168 11043 075507R      STB XTEMP+1      LOW MANTISSA/2
C169 11044 062506R      LDA XTEMP
C170 11045 015001X      FMP SA1
C170 11046 011052R
C171 11047 015002X      FAD SB1
C171 11050 011056R

```

```

C172 11051 027012R      JMP BTH2      Y=SB1+SA1*X
C173*
C174 11052 070000      SA1      DEC .875
      11053 000000
C175 11054 045000      SA2      DEC .578125
      11055 000000
C176 11056 043524      SB1      DEC .27863
      11057 046377
C177 11060 066000      SB2      DEC .421875
      11061 000377

```

```

C179*      *****
C180*      SUBROUTINE TO CALCULATE INT(X)
C181*      *****
C182*
C183*      CALLED BY A JMP EINT WITH THE ARGUMENT
C184*      IN FLOATING POINT FORM IN THE REGISTERS.
C185*      ENTIER(X) IS FLOATED AND RETURNED IN A & B
C186*
C187*      CALCULATES THE FLOATING POINT EQUIVALENT
C188*      OF ENTIER(X)
C189*
C190 11062 077037R EINT  STB SBOX      SAVE LOW WORD
C191 11063 064071      LDB .31      PRESET BIAS FOR
C192 11064 075042R      STB EXP      BINARY POINT
C193 11065 067037R      LDB SBOX      24-BIT
C194 11066 017160R      JSB IFIX      INTEGER?
C195 11067 027072R      JMP EINT1     NO
C196 11070 015647R      JSB .PACK     YES, PACK IT
C197 11071 025101R      JMP FOR12
C198 11072 063377R EINT1 LDA GETCR     RETRIEVE
C199 11073 067037R      LDB SBOX      NUMBER
C200 11074 025101R      JMP FOR12

```



## LIBRARY ROUTINES

```

0202*          *****
0203*          SUBROUTINE TO CALCULATE LOG(X)
0204*          *****
0205*
0206*          CALLED BY A JMP ELUG WITH THE ARGUMENT
0207*          IN FLOATING POINT FORM IN THE REGISTERS.
0208*          THE FLOATING RESULT IS RETURNED IN A & B
0209*
0210 11075 017077R ELUG JSB .LOG
0211 11076 025101R JMP FOR12
0212 11077 000000 .LOG NOP
0213 11100 002003 SZA,RSS NON-ZERO ARGUMENT?
0214 11101 027155R JMP .LOG1 NO
0215 11102 002020 SSA YES, POSITIVE ARGUMENT?
0216 11103 016274R JSB ERROR NO
0217 11104 072506R LUGER STA XTEMP YES
0218 11105 017223R JSB .FLUN
0219 11106 076507R STB XTEMP+1
0220 11107 017437R JSB FLOAT
0221 11110 072510R STA YTEMP
0222 11111 076511R STB YTEMP+1 Y=EXPO(X)
0223 11112 062506R LDA XTEMP
0224 11113 066507R LDB XTEMP+1
0225 11114 016002X FAD R22
      11115 011161R
0226 11116 072512R STA UTEMP
0227 11117 076513R STB UTEMP+1 U=X+SQR(0.5)
0228 11120 062506R LDA XTEMP
0229 11121 066507R LDB XTEMP+1
0230 11122 016003X FSB R22
      11123 011161R
0231 11124 016004X FDV UTEMP
      11125 010512R
0232 11126 072512R STA UTEMP
0233 11127 076513R STB UTEMP+1 U=(X-SQR(0.5))/U
0234 11130 016001X FMP UTEMP
      11131 010512R
0235 11132 016003X FSB CCC
      11133 011171R
0236 11134 072506R STA XTEMP
0237 11135 076507R STB XTEMP+1
0238 11136 063167R LDA MB
0239 11137 067170R LDB MB+1
0240 11140 016004X FDV XTEMP
      11141 010506R
0241 11142 016002X FAD AAA
      11143 011165R
0242 11144 016001X FMP UTEMP
      11145 010512R
0243 11146 016003X FSB HALF
      11147 000261R
0244 11150 016002X FAD YTEMP
      11151 010510R
0245 11152 016001X FMP LE2
      11153 011163R

```

## LIBRARY ROUTINES

```

0246 11154 127077R      JMP .LOG,I      ANS=LOG(2)*(EXPO(X)-0.5+U*
0247*                               (A-B/X))
0248 11155 015274R .LOG1 JSB ERROR      LOG OF ZERO
0249 11156 062263R LN2R  LDA MNEG      RETURN
0250 11157 065175R      LDB B776      NEGATIVE
0251 11160 127077R      JMP .LOG,I      INFINITY
0252*
0253 11161 055202 R22   DEC .707106781  SQR(0.5)
11162 075000
0254 11163 054271 LE2   DEC .6931471806  LOG BASE E OF 2
11164 095000
0255 11165 051260 AAA   DEC 1.2920070987
11166 037402
0256 11167 125606 MB    DEC -2.6398577035
11170 044404
0257 11171 065010 CCC   DEC 1.6567626301
11172 063002

0259*
0260* *****
0261* SUBROUTINE TO COMPUTE SGN(X)
0262* *****
0263*
0264* CALLED BY A JMP ESGN WITH THE ARGUMENT
0265* IN FLOATING POINT FORM IN THE REGISTERS.
0266* ON RETURN A & B CONTAIN THE FOLLOWING:
0267*
0268* IF X>0 THEN +1.
0269* IF X=0 THEN 0
0270* IF X<0 THEN -1.
0271 11173 006400 ESGN  CLB
0272 11174 002003      SZA,RSS      ZERO?
0273 11175 025101R      JMP FOR12      YES
0274 11176 002021      SSA,RSS      NO, POSITIVE?
0275 11177 064055      LDB .2      YES, SET EXPONENT
0276 11200 062263R      LDA FLGBT      LOAD MANTISSA
0277 11201 005002      SZB      POSITIVE?
0278 11202 001300      RAR      YES, CORRECT MANTISSA
0279 11203 025101R      JMP FOR12

```

```

0281*
0282*
0283*
0284*
0285*
0286*
0287*
0288*
*****
SUBROUTINE TO CALCULATE EXP(X)
*****

CALLED BY A JMP EEXP WITH THE ARGUMENT
IN FLOATING POINT FORM IN THE REGISTERS.
THE FLOATING RESULT IS RETURNED IN A & B

0289 11204 017206R EEXP JSB .EXP
0290 11205 025101R JMP FOR12
0291 11206 000000 .EXP NOP
0292 11207 015001X FMP L2E
      11210 011327R

0293 11211 072506R STA XTEMP
0294 11212 075507R STB XTEMP+1 X=Z*LOG2(E)
0295 11213 017420R JSB .IENT
0296 11214 027306R JMP .EXP1
0297 11215 073301R STA INTE INTE = ENTIER(X)
0298 11216 017437R JSB FLOAT
0299 11217 072510R STA YTEMP
0300 11220 075511R STB YTEMP+1 Y=ENTIER(X)
0301 11221 063301R LDA INTE
0302 11222 043315R ADA M124
0303 11223 002021 SSA,RSS INTE >=124 ?
0304 11224 027311R JMP EXPR-1 YES,ERROR
0305 11225 043316R ADA .244 INTE <-120 ?
0306 11226 002020 SSA
0307 11227 027303R JMP ZERE YES,ANS=0
0308 11230 062506R LDA XTEMP
0309 11231 065507R LDB XTEMP+1
0310 11232 015003X FSB YTEMP
      11233 010510R

0311 11234 072506R STA XTEMP
0312 11235 075507R STB XTEMP+1 X=X-ENTIER(X)
0313 11236 015001X FMP XTEMP
      11237 010506R

0314 11240 072512R STA UTEMP
0315 11241 075513R STB UTEMP+1 U=X**2
0316 11242 015002X FAD AAAA
      11243 011317R

0317 11244 072510R STA YTEMP
0318 11245 075511R STB YTEMP+1 Y=X**2+AAAA
0319 11246 063321R LDA BBBB
0320 11247 067322R LDB BBBB+1
0321 11250 015004X FDV YTEMP
      11251 010510R

0322 11252 072510R STA YTEMP
0323 11253 075511R STB YTEMP+1 Y=BBBBB/Y
0324 11254 063323R LDA CCCC
0325 11255 067324R LDB CCCC+1
0326 11256 015001X FMP UTEMP
      11257 010512R

0327 11260 015002X FAD DDDD
      11261 011325R

0328 11262 015003X FSB XTEMP

```

|       |       |         |       |                  |                                     |
|-------|-------|---------|-------|------------------|-------------------------------------|
|       | 11263 | 010506R |       |                  |                                     |
| C329  | 11264 | 015003X | FSB   | YTEMP            |                                     |
|       | 11265 | 010510R |       |                  |                                     |
| C330  | 11266 | 072510R | STA   | YTEMP            |                                     |
| C331  | 11267 | 076511R | STB   | YTEMP+1          | $Y = -X + DDDD + CCCC * X ** 2 - Y$ |
| C332  | 11270 | 062506R | LDA   | XTEMP            |                                     |
| C333  | 11271 | 066507R | LDB   | XTEMP+1          |                                     |
| C334  | 11272 | 015004X | FDV   | YTEMP            |                                     |
|       | 11273 | 010510R |       |                  |                                     |
| C335  | 11274 | 015002X | FAD   | HALF             |                                     |
|       | 11275 | 000261R |       |                  |                                     |
| C336  | 11276 | 037301R | ISZ   | INTE             |                                     |
| C337  | 11277 | 000000  | NOP   |                  |                                     |
| C338  | 11300 | 017445R | JSB   | .PWR2            |                                     |
| C339  | 11301 | 000000  | INTE  | UCT 0            |                                     |
| C340  | 11302 | 127206R | JMP   | .EXP, I          | $ANS = (0.5 + X/Y) * 2 ** INTE$     |
| C341  | 11303 | 002400  | ZERE  | CLA              |                                     |
| C342  | 11304 | 005400  |       | CLB              |                                     |
| C343  | 11305 | 127206R | JMP   | .EXP, I          | $ANS = 0$                           |
| C344  | 11306 | 063406R | .EXP1 | LDA X2TMP        |                                     |
| C345  | 11307 | 002020  |       | SSA              |                                     |
| C346  | 11310 | 027303R | JMP   | ZERE             |                                     |
| C347  | 11311 | 015274R | JSB   | ERROR            |                                     |
| C348  | 11312 | 062222R | EXPER | LDA INF          |                                     |
| C349  | 11313 | 064051  |       | LDB M2           |                                     |
| C350  | 11314 | 127206R | JMP   | .EXP, I          |                                     |
| C351* |       |         |       |                  |                                     |
| C352  | 11315 | 177604  | M124  | DEC -124         |                                     |
| C353  | 11316 | 000364  | .244  | DEC 244          |                                     |
| C354  | 11317 | 053552  | AAAA  | DEC 87.417497202 |                                     |
|       | 11320 | 160416  |       |                  |                                     |
| C355  | 11321 | 046477  | BBBB  | DEC 617.9722695  |                                     |
|       | 11322 | 015424  |       |                  |                                     |
| C356  | 11323 | 043372  | CCCC  | DEC .03465735903 |                                     |
|       | 11324 | 070371  |       |                  |                                     |
| C357  | 11325 | 047643  | DDDD  | DEC 9.9545957821 |                                     |
|       | 11326 | 001410  |       |                  |                                     |
| C358  | 11327 | 056125  | L2E   | DEC 1.4426950409 |                                     |
|       | 11330 | 017002  |       |                  |                                     |

```

C360*          *****
C361*          SUBROUTINE TO COMPUTE CHEBY(X)
C362*          *****
C363*
C364*          CALLING SEQUENCE:
C365*
C366*          LDA X          (FLOATING)
C367*          LDB X+1
C368*          JSB .CHEB      (RESULT FLOATING)
C369*          DEF C          (TABLE OF CHEBY.COEFFS.,FLOATING)
C370*
C371 11331 000000 .CHEB NOP
C372 11332 015001X FMP K2
      11333 010514R
C373 11334 073406R STA X2TMP
C374 11335 077407R STB X2TMP+1 X2 =X*2
C375 11336 157531R LDB .CHEB,I
C376 11337 077414R STB CTMP C POINTS TO COEFFICIENT TABLE
C377 11340 150001 LDA 1,I
C378 11341 005004 INB
C379 11342 164001 LDB 1,I GET FIRST COEFF
C380 11343 073416R STA DTMP
C381 11344 077417R STB DTMP+1 D=C(N)
C382 11345 002400 CLA
C383 11346 073412R STA BTMP
C384 11347 073413R STA BTMP+1 B=0
C385 11350 037414R LOPC ISZ CTMP
C386 11351 037414R ISZ CTMP N=N-1
C387 11352 163414R LDA CTMP,I
C388 11353 002003 SZB,RSS C(N)=0 ?
C389 11354 027376R JMP COOT ZERO FLAGS END OF TABLE
C390 11355 063412R LDA BTMP NO
C391 11356 067413R LDB BTMP+1
C392 11357 073410R STA ATMP
C393 11360 077411R STB ATMP+1 A=B
C394 11361 063416R LDA DTMP
C395 11362 067417R LDB DTMP+1
C396 11363 073412R STA BTMP
C397 11364 077413R STB BTMP+1 B=D
C398 11365 015001X FMP X2TMP
      11366 011406R
C399 11367 015003X FSB ATMP
      11370 011410R
C400 11371 015002X FAD CTMP,I
      11372 111414R
C401 11373 073416R STA DTMP
C402 11374 077417R STB DTMP+1 D=C(N) -A+B*X2
C403 11375 027350R JMP LOPC
C404 11376 063416R COOT LDA DTMP
C405 11377 067417R LDB DTMP+1
C406 11400 015003X FSB ATMP
      11401 011410R
C407 11402 015001X FMP HALF
      11403 000261R
C408 11404 037531R ISZ .CHEB

```

```

C409 11405 127331R      JMP .CHEB,I      ANS=(D-A)/2
C410*
C411 11406 000000      X2TMP BSS 2
C412 11410 000000      ATMP  BSS 2
C413 11412 000000      BTMP  BSS 2
C414 11414 000000      CTMP  BSS 2
C415 11416 000000      DTMP  BSS 2

```

```

C417*      *****
C418*      SUBROUTINE TO COMPUTE THE ENTIER OF A NUMBER
C419*      WHOSE EXPONENT IS LESS THAN 15
C420*      *****

```

```

C421*
C422*      CALLING SEQUENCE:

```

```

C423*
C424*      LDA X          (FLOATING)
C425*      LDA X+1
C426*      JSB .IENT      (RESULT INTERGER)
C427*      JSB ERROR      (EXIT IF EXPO(X)>14)
C428*
C429*

```

```

C430 11420 000000      .IENT NOP
C431 11421 073406R      STA X2TMP      STORE HIGH PART
C432 11422 060001      LDA 1          MOVE LOW PART TO A
C433 11423 010074      AND MSK0      ISOLATE EXPONENT
C434 11424 000033      SLA,RAR
C435 11425 027431R      JMP *+4      IF NEGATIVE OK
C436 11426 042235R      ADA M15
C437 11427 002021      SSA,RSS      EXPO(X) > 14
C438 11430 127420R      JMP .IENT,I   YES, ERROR RETURN
C439 11431 037420R      ISZ .IENT     NO BUMP RETURN POINT
C440 11432 063406R      LDA X2TMP     RESTORE HIGH PART
C441 11433 017160R      JSB IFIX      CALL ENTIER
C442 11434 000000      NOP
C443 11435 060001      LDA 1          PUT RESULT INTO (A)
C444 11436 127420R      JMP .IENT,I

```

## LIBRARY ROUTINES

```

C446*          *****
C447*          SUBROUTINE TO FLOAT AN INTEGER
C448*          *****
C449*
C450*          CALLED BY JSB FLOAT WITH INTEGER IN A
C451*          THE FLOATING POINT EQUIVALENT IS RETURNED
C452*          IN A & B
C453*
C454 11437 000000  FLOAT NOP
C455 11440 064070      LDB .15
C456 11441 075042R     STB EXP
C457 11442 005400      CLB
C458 11443 015647R     JSB .PACK
C459 11444 127437R     JMP FLOAT,I


C461*          *****
C462*          SUBROUTINE TO MULTIPLY BY A POWER OF TWO
C463*          *****
C464*
C465*          CALLING SEQUENCE
C466*
C467*          LDA X          (FLOATING)
C468*          LDB X+1
C469*          JSB .PWR2      (RESULT FLOATING)
C470*          DEC N          (INTEGER POWER)
C471*
C472*          RETURNS WITH  $X*2^N$  IN A&B
C473*          NO CHECK IS MADE FOR EXPONENT
C474*          OVERFLOW OR UNDERFLOW
C475*
C476 11445 000000  .PWR2 NOP
C477 11446 002003      SZR,RSS          X=0 ?
C478 11447 027461R     JMP .RET          YES, ANS=0
C479 11450 073406R     STA X2TMP
C480 11451 017223R     JSB .FLUN
C481 11452 077407R     STB X2TMP+1
C482 11453 143445R     ADA .PWR2,I
C483 11454 001200      RAL
C484 11455 010074      AND MSK0          NEW EXPO = (OLD EXPO) +N
C485 11456 079001      STA 1
C486 11457 047407R     ADB X2TMP+1      KEEP OLD MANTISSA
C487 11460 063406R     LDA X2TMP
C488 11461 037445R     .RET  ISZ .PWR2
C489 11462 127445R     JMP .PWR2,I


C491 11463 000000  TT1  BSS 1
C492 11464 000000  TT2  BSS 1
C493 00051         TT3  EQU TEMPS+4
C494 00052         TT4  EQU TEMPS+5
C495 11037         FFLAG EQU SBOX

```

```

C497*
C498*
C499*
C500 11465 017062R EMAT JSB LDIMP
C501 11466 035045R ISZ TEMPS MAT READ
C502 11467 012173R AND MSK1A :::
C503 11470 002002 SZA MAT PRINT?
C504 11471 027620R JMP EMAT7 NO
C505 11472 017062R JSB LDIMP YES
C506 11473 012220R AND OPMSK SAVE
C507 11474 072057R STA MLBX1 TYPE
C508 11475 052213R CPA RDOP PRINT?
C509 11476 002001 RSS NO
C510 11477 015671R JSB PRNIN YES
C511*
C512 11500 017062R EMAT1 JSB LDIMP LOAD
C513 11501 012176R AND MSK1 OPERAND
C514 11502 002003 SZA,RSS NULL? (END OF MAT PRINT)
C515 11503 025233R JMP XEC4 YES
C516 11504 017613R JSB SSYMT NO, SEARCH THE SYMBOL TABLE
C517 11505 005007 INB,SZB,RSS FOUND?
C518 11506 027302R JMP E8-1 NO
C519 11507 035045R ISZ TEMPS YES
C520 11510 160001 LDA 1,I SAVE ARRAY
C521 11511 012222R AND INF
C522 11512 072061R STA B1 BASE ADDRESS
C523 11513 062057R LDA MLBX1
C524 11514 052213R CPA RDOP READ?
C525 11515 027571R JMP EMAT5 YES
C526 11516 044055 ADB .2 NO
C527 11517 160001 LDA 1,I SAVE
C528 11520 072062R STA B1+1 DIMENSIONS
C529 11521 010074 AND MSK0 SET
C530 11522 003004 CMA,INA COLUMN
C531 11523 072063R STA B2 COUNTERS
C532 11524 072064R STA B2+1
C533 11525 160001 LDA 1,I SET
C534 11526 001727 ALF,ALF
C535 11527 010074 AND MSK0 ROW
C536 11530 003004 CMA,INA
C537 11531 072065R STA B3 COUNTER
C538 11532 015076R JSB LCHK2 SET DELIMITER
C539 11533 002400 CLA SET DELIMITER
C540 11534 072001R STA MCKS AS COMMA
C541 11535 062045R LDA TEMPS MORE
C542 11536 052031R CPA PRADD STATEMENT?
C543 11537 027550R JMP EMAT3 NO
C544 11540 017062R JSB LDIMP YES
C545 11541 012220R AND OPMSK EXTRACT DELIMITER
C546 11542 052200R CPA B1400 ::
C547 11543 035001R ISZ MCKS YES
C548 11544 027550R JMP EMAT3
C549 11545 005400 EMAT2 CLB COMMA
C550 11546 055001R CPB MCKS DELIMITER?
C551 11547 017440R JSB EDELM YES

```



|       |       |         |       |           |                           |
|-------|-------|---------|-------|-----------|---------------------------|
| 0552  | 11550 | 017322R | EMAT3 | JSB DDLD  | LOAD                      |
| 0553  | 11551 | 000061R |       | DEF B1    | NEXT                      |
| 0554  | 11552 | 035061R |       | ISZ B1    | ELEMENT                   |
| 0555  | 11553 | 035061R |       | ISZ B1    |                           |
| 0556  | 11554 | 017426R |       | JSB ENOUT | OUTPUT IT                 |
| 0557  | 11555 | 035063R |       | ISZ B2    | ROW COMPLETE?             |
| 0558  | 11556 | 027545R |       | JMP EMAT2 | NO                        |
| 0559  | 11557 | 017461R |       | JSB OUTLN | YES, DO                   |
| 0560  | 11560 | 017461R |       | JSB OUTLN | SPACING                   |
| 0561  | 11561 | 062064R |       | LDA B2+1  | RESET                     |
| 0562  | 11562 | 072063R |       | STA B2    | COLUMN COUNTER            |
| 0563  | 11563 | 035065R |       | ISZ B3    | ARRAY EXHAUSTED?          |
| 0564  | 11564 | 027550R |       | JMP EMAT3 | NO                        |
| 0565  | 11565 | 065045R | EMAT4 | LDB TEMPS | YES, MORE                 |
| 0566  | 11566 | 055031R |       | CPB PRADD | STATEMENT?                |
| 0567  | 11567 | 025233R |       | JMP XEC4  | NO                        |
| 0568  | 11570 | 027500R |       | JMP EMAT1 | YES                       |
| 0569* |       |         |       |           |                           |
| 0570  | 11571 | 075063R | EMAT5 | STB B2    | SAVE SYMBOL TABLE POINTER |
| 0571  | 11572 | 017062R |       | JSB LDIMP | EXTRACT                   |
| 0572  | 11573 | 012220R |       | AND OPMSK | NEXT OPERATOR             |
| 0573  | 11574 | 065045R |       | LDB TEMPS | STATEMENT                 |
| 0574  | 11575 | 055031R |       | CPB PRADD | EXHAUSTED?                |
| 0575  | 11576 | 002400  |       | CLA       | YES                       |
| 0576  | 11577 | 052206R |       | CPA B1100 | ::                        |
| 0577  | 11600 | 017744R |       | JSB REDIM | YES, REDIMENSION ARRAY    |
| 0578  | 11601 | 062063R |       | LDA B2    | LOAD                      |
| 0579  | 11602 | 040055  |       | ADA .2    | ARRAY                     |
| 0580  | 11603 | 160000  |       | LDA 0,1   | DIMENSIONS                |
| 0581  | 11604 | 017130R |       | JSB MDIM  | SET                       |
| 0582  | 11605 | 001100  |       | ARS       | ARRAY                     |
| 0583  | 11606 | 003004  |       | CMA,INA   | ELEMENT                   |
| 0584  | 11607 | 072065R |       | STA B3    | COUNTER                   |
| 0585  | 11610 | 015324R | EMAT6 | JSB FOATA | FETCH VALUE               |
| 0586  | 11611 | 017342R |       | JSB DDST  | STORE                     |
| 0587  | 11612 | 000061R |       | DEF B1    |                           |
| 0588  | 11613 | 035061R |       | ISZ B1    | IT                        |
| 0589  | 11614 | 035061R |       | ISZ B1    |                           |
| 0590  | 11615 | 035065R |       | ISZ B3    | ARRAY EXHAUSTED?          |
| 0591  | 11616 | 027610R |       | JMP EMAT6 | NO                        |
| 0592  | 11617 | 027565R |       | JMP EMAT4 | YES                       |
| 0593* |       |         |       |           |                           |
| 0594  | 11620 | 017613R | EMAT7 | JSB SSYMT | SAVE                      |
| 0595  | 11621 | 005004  |       | INB       | BASE ADDRESS              |
| 0596  | 11622 | 160001  |       | LDA 1,1   | OF .DESTINATION           |
| 0597  | 11623 | 012222R |       | AND INF   |                           |
| 0598  | 11624 | 072065R |       | STA B3    | ARRAY                     |
| 0599  | 11625 | 075063R |       | STB B2    | SAVE SYMBOL TABLE ADDRESS |
| 0600  | 11626 | 044055  |       | ADB .2    | SAVE                      |
| 0601  | 11627 | 160001  |       | LDA 1,1   | ITS                       |
| 0602  | 11630 | 072066R |       | STA B3+1  | DIMENSIONS                |
| 0603  | 11631 | 002404  |       | CLA,INA   | ASSUME MAT                |
| 0604  | 11632 | 073440R |       | STA EDELM | REPLACEMENT               |
| 0605  | 11633 | 017062R | EMAT8 | JSB LDIMP | LOAD NEXT                 |
| 0606  | 11634 | 035045R |       | ISZ TEMPS | OPERAND                   |

|       |       |         |                    |                        |
|-------|-------|---------|--------------------|------------------------|
| 0607  | 11635 | 002020  | SSA                | ARRAY FUNCTION?        |
| 0608  | 11636 | 027723R | JMP EMA11          | YES                    |
| 0609  | 11637 | 012176R | EMAT8 AND MSK1     | NO                     |
| 0610  | 11640 | 002003  | SZA, RSS           | SCALAR MULTIPLICATION? |
| 0611  | 11641 | 027713R | JMP EMA10          | YES                    |
| 0612  | 11642 | 017613R | JSB SSYMT          | NO                     |
| 0613  | 11643 | 005004  | INB                | SAVE                   |
| 0614  | 11644 | 160001  | LDA 1,1            | BASE                   |
| 0615  | 11645 | 012222R | AND INF            |                        |
| 0616  | 11646 | 072061R | STA B1             | ADDRESS AND            |
| 0617  | 11647 | 044055  | ADB .2             | DIMENSIONS             |
| 0618  | 11650 | 160001  | LDA 1,1            | OF FIRST               |
| 0619  | 11651 | 072062R | STA B1+1           | SOURCE ARRAY           |
| 0620  | 11652 | 065045R | LDB TEMPS          | STATEMENT              |
| 0621  | 11653 | 055031R | CPB PRADD          | EXHAUSTED?             |
| 0622  | 11654 | 027674R | JMP EMAT9          | YES                    |
| 0623  | 11655 | 017062R | JSB LDIMP          | NO EXTRACT             |
| 0624  | 11656 | 001727  | ALF, ALF           | AND                    |
| 0625  | 11657 | 010072  | AND .63            | RECORD                 |
| 0626  | 11660 | 040045  | ADA M6             | EMAT                   |
| 0627  | 11661 | 073440R | STA EDELM          | OPERATOR               |
| 0628  | 11662 | 017062R | JSB LDIMP          | SAVE                   |
| 0629  | 11663 | 012176R | AND MSK1           |                        |
| 0630  | 11664 | 017613R | JSB SSYMT          | BASE ADDRESS           |
| 0631  | 11665 | 005004  | INB                |                        |
| 0632  | 11666 | 160001  | LDA 1,1            | AND DIMENSIONS         |
| 0633  | 11667 | 012222R | AND INF            |                        |
| 0634  | 11670 | 072063R | STA B2             |                        |
| 0635  | 11671 | 044055  | ADB .2             | OF SECOND              |
| 0636  | 11672 | 160001  | LDA 1,1            |                        |
| 0637  | 11673 | 072064R | STA B2+1           | SOURCE ARRAY           |
| 0638* |       |         |                    |                        |
| 0639  | 11674 | 063440R | EMAT9 LDA EDELM    | TRANSFER TO            |
| 0640  | 11675 | 043700R | ADA LMAP           | APPROPRIATE            |
| 0641  | 11676 | 114000  | JSB 0,1            | ROUTINE                |
| 0642  | 11677 | 025233R | JMP XEC4           |                        |
| 0643* |       |         |                    |                        |
| 0644  | 11700 | 111700R | LMAP DEF LBASE-1,1 |                        |
| 0645  | 11701 | 012151R | LBASE DEF REPLC    |                        |
| 0646  | 11702 | 012134R | DEF ADD            |                        |
| 0647  | 11703 | 012144R | DEF SUB            |                        |
| 0648  | 11704 | 012314R | DEF MULT           |                        |
| 0649  | 11705 | 012212R | DEF SZER           |                        |
| 0650  | 11706 | 012167R | DEF LCON           |                        |
| 0651  | 11707 | 012220R | DEF LIDN           |                        |
| 0652  | 11710 | 012424R | DEF LINV           |                        |
| 0653  | 11711 | 012252R | DEF TRAN           |                        |
| 0654  | 11712 | 012162R | DEF SMULT          |                        |
| 0655* |       |         |                    |                        |
| 0656  | 11715 | 050065  | EMA10 LDA .10      | SET SMULT              |
| 0657  | 11714 | 073440R | STA EDELM          | OPERATOR               |
| 0658  | 11715 | 015255R | JSB FEICH          | EVALUATE               |
| 0659  | 11716 | 072057R | STA MLBX1          | AND SAVE               |
| 0660  | 11717 | 075060R | STB MLBX1+1        | SCALAR                 |
| 0661  | 11720 | 055045R | ISZ TEMPS          | GO TO                  |

|       |       |         |                 |                |
|-------|-------|---------|-----------------|----------------|
| 0662  | 11721 | 036045R | ISZ TEMPS       | PROCESS        |
| 0663  | 11722 | 027633R | JMP EMAT0       | SOURCE ARRAY   |
| 0664* |       |         |                 |                |
| 0665  | 11723 | 001727  | EMA11 ALF,ALF   | EXTRACT        |
| 0666  | 11724 | 001722  | ALF,RAL :::     |                |
| 0667  | 11725 | 010071  | AND .31         | TYPE           |
| 0668  | 11726 | 040043  | ADA M8          | RECORD EMAT    |
| 0669  | 11727 | 073440R | STA EDELM       | OPERATOR TYPE  |
| 0670  | 11730 | 040043  | ADA M8          | INV OR         |
| 0671  | 11731 | 002020  | SSA             | TRN?           |
| 0672  | 11732 | 027737R | JMP EMA12       | NO             |
| 0673  | 11733 | 017062R | JSB LDIMP       | YES, LOAD      |
| 0674  | 11734 | 036045R | ISZ TEMPS       | SOURCE         |
| 0675  | 11735 | 036045R | ISZ TEMPS       | ARRAY          |
| 0676  | 11736 | 027637R | JMP EMAT8       | SYMBOL         |
| 0677* |       |         |                 |                |
| 0678  | 11737 | 066045R | EMA12 LDB TEMPS | REDIMENSIONING |
| 0679  | 11740 | 056031R | CPB PRADD       | PART?          |
| 0680  | 11741 | 027674R | JMP EMAT9       | NO             |
| 0681  | 11742 | 017744R | JSB REDIM       | YES            |
| 0682  | 11743 | 027674R | JMP EMAT9       |                |

|       |       |         |                                 |                           |
|-------|-------|---------|---------------------------------|---------------------------|
| 0684* |       |         | *****                           |                           |
| 0685* |       |         | SUBROUTINE TO REDIMENSION ARRAY |                           |
| 0686* |       |         | *****                           |                           |
| 0687  | 11744 | 000000  | REDIM NOP                       |                           |
| 0688  | 11745 | 016001R | JSB MCKS                        | EVALUATE                  |
| 0689  | 11746 | 005727  | BLF,BLF                         | AND SAVE                  |
| 0690  | 11747 | 075066R | STB B3+1                        | ROW COUNT                 |
| 0691  | 11750 | 006404  | CLB,INB                         | LOAD DEFAULT COLUMN COUNT |
| 0692  | 11751 | 036045R | ISZ TEMPS                       | SINGLE                    |
| 0693  | 11752 | 017062R | JSB LDIMP                       | DIMENSION                 |
| 0694  | 11753 | 012220R | AND OPMSK                       | ARRAY?                    |
| 0695  | 11754 | 052203R | CPA B2400 ::                    |                           |
| 0696  | 11755 | 027760R | JMP REDI1                       | YES                       |
| 0697  | 11756 | 016001R | JSB MCKS                        | NO, EVALUATE COLUMN COUNT |
| 0698  | 11757 | 036045R | ISZ TEMPS                       | MOVE PAST                 |
| 0699  | 11760 | 036045R | REDI1 ISZ TEMPS                 | RIGHT BRACKET             |
| 0700  | 11761 | 046066R | ADB B3+1                        | PACK                      |
| 0701  | 11762 | 075066R | STB B3+1                        | DIMENSIONS                |
| 0702  | 11763 | 062063R | LDA B2                          | STORE IN                  |
| 0703  | 11764 | 040055  | ADA .2                          | SYMBOL                    |
| 0704  | 11765 | 174000  | STB 0,I                         | TABLE                     |
| 0705  | 11766 | 040052  | ADA M1                          | COMPUTE                   |
| 0706  | 11767 | 160000  | LDA 0,I                         | PHYSICAL                  |
| 0707  | 11770 | 017130R | JSB MDIM                        | ARRAY SPACE               |
| 0708  | 11771 | 072060R | STA MLBX1+1                     | SIZE                      |
| 0709  | 11772 | 062066R | LDA B3+1                        | COMPUTE                   |
| 0710  | 11773 | 017130R | JSB MDIM                        | NEW SIZE                  |
| 0711  | 11774 | 003004  | CMA,INA                         | NEW                       |
| 0712  | 11775 | 042060R | ADA MLBX1+1                     | SIZE                      |

|      |       |            |             |             |
|------|-------|------------|-------------|-------------|
| C713 | 11776 | 002020     | SSA         | ACCEPTABLE? |
| C714 | 11777 | 015274R    | JSB ERROR   | NO          |
| C715 | 12000 | 127744R E7 | JMP REDIM,I | YES         |

```

C717*
C718*
C719*
C720 12001 000000 MCKS NOP
C721 12002 015255R JSB FETCH CALL FOR EVALUATION
C722 12003 017147R JSB SBFIX CONVERT TO INTEGER (ROUNDED)
C723 12004 005004 INB UNBIAS SUBSCRIPT
C724 12005 050001 LDA 1 PUT INTO (A)
C725 12006 040075 ADA M256 LESS THAN
C726 12007 002021 SSA,RSS 256?
C727 12010 027221R JMP E6-1 NO
C728 12011 126001R JMP MCKS,I YES, RETURN SUBSCRIPT IN (B)

```

```

C730*
C731*****
C732*****      MATRIX      ROUTINES      *****
C733*****
C734*CALL FOR MATRIX OPERATION IS MADE WITH FOUR*
C735*PARAMETERS,ROUTINE NUMBER AND ADDRESS OF  *
C736*SYMBOL TABLE OF THREE MATRICES. FOR SCALAR *
C737*MULT, LAST IS ADDRESS OF SCALAR VALUE      *
C738*OPERATION IS OF FORM  B3=B1 OP B2          *
C739*THE ADDRESS OF THE BASE ADDRESS OF MATRICES*
C740*IS GIVEN IN B1,B2,B3. THE DIMENSIONS OF A  *
C741*MATRIX IS GIVEN IN B(1)+1, ROWS IN MOST SIG*
C742*PART(MSP) AND COLUMN IN LEAST SIG PART(LSP)*
C743*****
C744*
C745*
C746*
C747*****
C748***      SUBROUTINE  GENERAL      ***
C749*****
C750*B3=B1 OP B2  SUBROUTINE COMPUTES AN ELEMENT*
C751*OF B3 AND INCREMENTS TO NEXT ELEMENT. THE  *
C752*OPERATION THAT IS PERFORMED AND            *
C753* THE MATRICES INCREMENTED ARE              *
C754* MODIFIED BY ROUTINES ADD, SUB, REPL      *
C755*SCALAR MULT, CON,ZERO,IDN. ROUTINE CHECKS  *
C756*COMPATIBILITY OF THREE MATRICES USING SUB *
C757*COMPAKE (PARAMETERS SUPPLIED IN REG A,B)  *
C758*****
C759*
C760 12012 000000  GENER NOP          SUBROUTINE GENERAL
C761 12013 062064R      LDA B2+1      LOAD DIM FOR MATRIX 2
C762 12014 065062R      LDB B1+1      LOAD DIM FOR MATRIX 1
C763 12015 015063R      JSB COMPR     CHECKS ROW AND COL DIM
C764*                                ARE COMPATIBLE
C001 12016 062062R GEN2  LDA B1+1      LOAD DIM FOR MATRIX 1
C002 12017 065066R      LDB B3+1      LOAD DIM FOR MATRIX 3
C003 12020 015063R      JSB COMPR     CHECK ROW AND COL DIM
C004 12021 100200      MPY T3         COLUMNS IN (A), ROWS IN T3
      12022 013273R
C005 12023 003004      CMA,INA
C006 12024 073312R      STA LPIV      -ROWS*COLUMNS
C007*                                COMPUTES B3=B1 OP B2
C008 12025 017322R LOOP  JSB DDLD     LOAD
C009 12026 000061R      DEF B1        NEXT
C010 12027 035061R      ISZ B1        SOURCE
C011 12030 035061R      ISZ B1        ELEMENT
C012 12031 126032R      JMP ++1,I
C013 12032 000000  MOD  BSS 1
C014 12033 017342R      JSB DDST     STORE
C015 12034 000065R      DEF B3        NEXT
C016 12035 035065R      ISZ B3        DESTINATION
C017 12036 035065R      ISZ B3        ELEMENT
C018 12037 059046      LDA M5
C019 12040 042062R      ADA MOD2

```

```

0020 12041 002021      SSA,RSS
0021 12042 025045R      JMP **3
0022 12043 035063R      ISZ B2
0023 12044 035063R      ISZ B2
0024 12045 037312R      ISZ LPIV
0025 12046 025025R      JMP LOOP      COMPUTE NEXT ELEMENT
0026 12047 125012R      JMP GENER,I
0027 12050 012050R MOD1  DEF *
0028 12051 017403R      JSB .FAD.
0029 12052 100063R      DEF B2,I
0030 12053 025033R      JMP MOD+1
0031 12054 017412R      JSB .FSB.
0032 12055 100063R      DEF B2,I
0033 12056 025033R      JMP MOD+1
0034 12057 017421R      JSB .FMP.
0035 12060 000123R      DEF MBXL
0036 12061 025033R      JMP MOD+1
0037 12062 000000 MOD2  BSS 1
0038*
0039*
0040*****
0041****      SUBROUTINE COMPARE      ****
0042*****
0043*ROUTINE COMPARES DIM OF TWO MATRICES GIVEN *
0044*THEIR DIM IN REGISTERS A,B      *
0045*DIMENSIONS ARE GIVEN IN B(I)+2      *
0046*****
0047*
0048 12063 000000  COMPR NOP
0049 12064 050001      CPA 1      EQUAL?
0050 12065 002001      RSS      YES
0051 12066 016274R LERR  JSB ERROR      NO
0052 12067 001727      ALF,ALF      SAVE
0053 12070 010074      AND MSK0      # OF
0054 12071 073273R      STA T3      ROWS
0055 12072 060001      LDA 1
0056 12073 010074      AND MSK0      SAVE #
0057 12074 073274R      STA T4      OF COLUMNS
0058 12075 125063R      JMP COMPR,I
0059*
0060*
0061*****
0062*****      SUBROUTINE LCHK      *****
0063*****
0064*TESTS THAT NO ELEMENT IN A MATRIX IS      *
0065*UNASSIGNED. ENTRY1 CHECKS MATRICES GIVEN BY*
0066*B1 AND B2 AND ENTRY 2 CHECKS ONLY B1      *
0067*****
0068*
0069 12076 000000  LCHK2 NOP
0070 12077 062076R      LDA LCHK2
0071 12100 072102R      STA LCHK1
0072 12101 025106R      JMP **5
0073 12102 000000  LCHK1 NOP
0074 12103 065063R      LDB B2      BASE ADDR

```

```

C075 12104 062064R      LDA B2+1      ROW AND COL DIM.
C076 12105 016112R      JSB LCHK4      TEST EACH TERM OF B2
C077 12106 065061R      LDB B1        BASE ADDR
C078 12107 062062R      LDA B1+1      ROW AND COL DIM.
C079 12110 016112R      JSB LCHK4      TEST EACH TERM OF B1
C080 12111 126102R      JMP LCHK1,I
C081*
C082 12112 000000      LCHK4 NOP        SUBROUTINE TO TEST TERMS
C083 12113 077276R      STB T6         SAVE
C084 12114 017130R      JSB MDIM       COMPUTE SIZE OF MATRIX
C085 12115 001100      ARS            SET NEGATIVE
C086 12116 003004      CMA,1NA
C087 12117 073277R      STA T7         COUNTER FOR ELEMENTS
C088 12120 017322R      LCHK6 JSB DDLD   LOAD
C089 12121 013276R      DEF T6
C090 12122 037276R      ISZ T6         ELEMENT
C091 12123 037276R      ISZ T6
C092 12124 052263R      CPA MNEG       COMPARE WITH PRESET QTY.
C093 12125 025127R      JMP *+2
C094 12126 025131R      JMP LCHK5
C095 12127 055264R      CFB MNEG+1
C096 12130 016274R      JSB ERROR      ERROR 'MAT UNASSIGNED'
C097 12131 037277R      LCHK5 ISZ T7    DONE?
C098 12132 025120R      JMP LCHK6      NO
C099 12133 126112R      JMP LCHK4,I    YES
C100*
C101*
C102*****
C103**** SUBROUTINE MATRIX ADD ****
C104*****
C105*B1,B2,B3 CONTAIN ADDRESS OF BASE ADDRESS OF*
C106*THREE MATRICES. ROUTINE EXECUTES B3=B1+B2 *
C107*BY MODIFYING INSTR IN ROUTINE GENERAL *
C108*****
C109*
C110 12134 000000      ADD      NOP
C111 12135 060054      LDA .1
C112 12136 072062R      ADD1     STA MOD2
C113 12137 042050R      ADA MOD1
C114 12140 072032R      STA MOD
C115 12141 016102R      JSB LCHK1     TEST B1,B2 FOR UNASSIGNED TERMS
C116 12142 016012R      JSB GENER     ROUTINE GENERAL
C117 12143 126134R      JMP ADD,I     EXIT TO MAIN PROGRAM
C118*
C119*
C120*****
C121**** SUBROUTINE MATRIX SUBTRACT ****
C122*****
C123*B1,B2,B3 CONTAIN ADDRESS OF BASE ADDRESS OF*
C124*THREE MATRICES. ROUTINE EXECUTES B3=B1-B2 *
C125*BY MODIFYING INSTR IN ROUTINE GENERAL *
C126*****
C127*
C128 12144 000000      SUB      NOP      LET
C129 12145 062144R      LDA SUB      ADD DO

```



|      |       |         |          |        |
|------|-------|---------|----------|--------|
| C130 | 12146 | 072154R | STA ADD  | RETURN |
| C131 | 12147 | 060057  | LDA .4   |        |
| C132 | 12150 | 026136R | JMP ADD1 |        |

```

C134*
C135*****
C136**** SUBROUTINE MATRIX REPLACE ****
C137*****
C138*B1,B3 GIVE ADDRESS OF BASE ADDRESS OF GIVEN*
C139*MATRIX AND RECEIVING MATRIX RESPECTIVELY *
C140*****
C141 12151 000000 REPLC NOP LET
C142 12152 062151R LDA REPLC GENER DO
C143 12153 072012R STA GENER RETURN
C144 12154 060064 LDA .9
C145 12155 072062R REPL1 STA MOD2
C146 12156 042050R ADA MOD1
C147 12157 072032R STA MOD
C148 12160 016076R JSB LCHK2 TEST B1 FOR UNASSIGNED ELEMENTS
C149 12161 025016R JMP GEN2
C150*
C151*
C152*****
C153**** SUBROUTINE MATRIX SCALAR MULT ****
C154*****
C155*B1,B3 GIVE ADDRESS OF BASE ADDRESS OF GIVEN*
C156*MATRIX AND RECEIVING MATRIX RESPECTIVELY *
C157*MBXL HOLDS ADDRESS OF SCALAR VALUE *
C158*****
C159*
C160 12162 000000 SMULT NOP LET
C161 12163 062162R LDA SMULT GENER DO
C162 12164 072012R STA GENER RETURN
C163 12165 060062 LDA .7
C164 12166 025155R JMP REPL1
C165*
C166*
C167*****
C168**** SUBROUTINE MATRIX CON ****
C169*****
C170*SETS MATRIX TO ALL ONES. B3 IS ADDRESS OF *
C171*BASE ADDRESS OF MATRIX. *
C172*****
C173*
C174 12167 000000 LCON NOP
C175 12170 062261R LDA HONE
C176 12171 064055 LDB .2
C177 12172 072057R LCON1 STA MLBX1 SET
C178 12173 075060R STB MLBX1+1 CONSTANT
C179 12174 062066R LDA B3+1
C180 12175 017130R JSB MDIM SET
C181 12176 001100 ARS ELEMENT
C182 12177 003004 CMA,INA COUNTER
C183 12200 073512R STA LPIV
C184 12201 062057R LDA MLBX1 LOAD
C185 12202 065060R LDB MLBX1+1 CONSTANT
C186 12203 017342R LCON2 JSB DDST STORE
C187 12204 000065R DEF B3 IN
C188 12205 035065R ISZ B3 NEXT

```

```

C189 12206 036065R      ISZ B3      ELEMENT
C190 12207 037312R      ISZ LPIV     DONE?
C191 12210 026203R      JMP LCON2     NO
C192 12211 126167R      JMP LCON,I    YES
C193*
C194*
C195*****
C196**** SUBROUTINE MATRIX ZERO ****
C197*****
C198*SETS MATRIX TO ZERO. B3 IS ADDRESS OF BASE *
C199*ADDRESS OF MATRIX. B1,B2 ARE REDUNDANT *
C200*SET B1=0 AND USE SUBROUTINE CON,ENTRY2 *
C201*****
C202*
C203 12212 000000 SZER NOP
C204 12213 062212R      LDA SZER      CONVERT
C205 12214 072167R      STA LCON
C206 12215 002400      CLA            LCON
C207 12216 006400      CLB
C208 12217 026172R      JMP LCON1     TO SZER
C209*
C210*
C211*****
C212**** SUBROUTINE MATRIX IDN ****
C213*****
C214*ROUTINE SETS UP IDENTITY MATRIX *
C215*B3 IS ADDRESS OF BASE ADDRESS OF MATRIX *
C216*USE SZER TO SET MATRIX TO ALL ZEROS. ON *
C217*RETURN CHECK FOR SQUARE MATRIX. *
C218*****
C219*
C220 12220 000000 LIDN NOP
C221 12221 062065R      LDA B3
C222 12222 073301R      STA T9      SAVE BASE ADDRESS
C223 12223 016212R      JSB SZER     SET ALL MATRIX TO ZERO
C224 12224 062066R      LDA B3+1    IS
C225 12225 001727      ALF,ALF      ARRAY
C226 12226 052066R      CPA B3+1    SQUARE?
C227 12227 001010      ALS,SLA      YES
C228 12230 026066R      JMP LERR     NO
C229 12231 012176R      AND MSK1    SAVE ROW
C230 12232 072057R      STA MLBX1    LENGTH
C231 12233 001100      ARS          SAVE
C232 12234 003004      CMA,INA      ROW
C233 12235 072060R      STA MLBX1+1  COUNTER
C234 12236 067301R      LDB T9      RESTORE
C235 12237 076065R      STB B3      B3
C236 12240 062261R LIDN1 LDA HUNE    STORE
C237 12241 017055R      JSB STBI
C238 12242 006004      INB          1.0 ON
C239 12243 060055      LDA .2
C240 12244 017055R      JSB STBI    DIAGONAL
C241 12245 006004      INB
C242 12246 046057R      ADB MLBX1    MOVE TO NEXT DIAGONAL ELEMENT
C243 12247 036060R      ISZ MLBX1+1  DONE?

```

|      |       |         |
|------|-------|---------|
| 0244 | 12250 | 026240R |
| 0245 | 12251 | 126220R |

|            |     |
|------------|-----|
| JMP LIDN1  | NO  |
| JMP LIDN,I | YES |

```

0247*
0248*****
0249**** SUBROUTINE TRANSPOSE *****
0250*****
0251*TRANSPOSE OF FORM B3(M,N)=T(B1(N,M)) *
0252*B1,B3 GIVE ADDRESS OF BASE ADDRESS OF GIVEN*
0253*AND RECEIVING MATRICES RESPECTIVELY. *
0254*****
0255*
0256 12252 000000 TRAN NGP
0257 12253 015076R JSB LCHK2 TEST B1 FOR UNASSIGNED TERMS
0258* CHECK DIMENSIONS
0259 12254 062066R LDA B3+1 PARAMETERS OF B3
0260 12255 001727 ALF,ALF INTERCHANGE ROW AND COLUMN
0261 12256 065062R LDB B1+1 PARAMETERS OF B1
0262 12257 015063R JSB COMPR SUBROUTINE COMPARE
0263* DIMENSIONS COMPATIBLE
0264 12260 109200 MPY T3 #OF COLUMNS IN (A), # OF ROWS IN T3
      12261 013273R
0265 12262 073312R STA LP1V PRODUCT OF ROW*COL
0266 12263 063274R LDA T4 SET
0267 12264 003004 CMA,INA COLUMN
0268 12265 073275R STA T5 COUNTER
0269* T6 IS INDICATOR TO SELECT
0270* WHICH ELEMENT IN A COL OF
0271* B1 IS TO BE TRANSPOSED
0272 12266 002400 TRAN1 CLA
0273 12267 073276R STA T6 SET T6=0
0274 12270 067276R LNEXT LDB T6 LOAD
0275 12271 005000 BLS
0276 12272 045061R ADB B1 NEXT ELEMENT
0277 12273 060001 LDA B
0278 12274 017505R JSB FTHOP OF COLUMN
0279 12275 017342R JSB DDST STORE
0280 12276 000065R DEF B3 IN
0281 12277 035065R ISZ B3 ROW
0282 12300 035065R ISZ B3
0283 12301 063276R LDA T6 SET T6=T6+T4
0284 12302 043274R ADA T4 T6 POINTS TO NEXT TERM IN
0285 12303 073276R STA T6 A COLUMN TO BE TRANSPOSED
0286 12304 053312R CPA LP1V TEST FOR LAST IN COL
0287 12305 025307R JMP **2
0288 12306 026270R JMP LNEXT
0289* SET BASE ADDRESS TO FIRST
0290* TERM IN NEXT COLUMN
0291 12307 035061R ISZ B1
0292 12310 035061R ISZ B1
0293 12311 037275R ISZ T5
0294 12312 025266R JMP TRAN1 TRANSPOSE NEXT COL
0295 12313 125252R JMP TRAN,I EXIT TO MAIN PROGRAM

```

```

C297*
C298*****
C299**** SUBROUTINE MATRIX MULT *****
C300*****
C301*ROUTINE IS OF FORM B3(M,P)=B1(M,N)*B2(N,P) *
C302*B1,B2,B3 ARE ADDRESSES OF BASE ADDRESSES OF*
C303*THREE MATRICES *
C304*****
C305*
C306 12314 000000 MULT NOP
C307 12315 015102R JSB LCHK1 TEST B1,B2 FOR UNASSIGNED TERMS
C308* CHECK DIMENSIONS
C309 12316 062066R LDA B3+1 PARAMETERS OF B3
C310 12317 010074 AND MSK0 SAVE COLUMN COUNT
C311 12320 073276R STA T6
C312 12321 062064R LDA B2+1 PARAMETERS OF B2
C313 12322 010074 AND MSK0
C314 12323 053276R CPA T6 COLUMNS EQUAL
C315 12324 002001 RSS IN NUMBER?
C316 12325 025066R JMP LERR NO
C317* COMBINE B3,B2 PARAMETERS
C318* INTO (M,N) AND COMPARE
C319* WITH THOSE OF B1
C320 12326 062066R LDA B3+1 PARAMETERS OF B3
C321 12327 010075 AND M256
C322 12330 070001 STA 1 STORE ROW IN MSP OF B
C323 12331 062064R LDA B2+1 PARAMETERS OF B2
C324 12332 001727 ALF,ALF GET ROW COUNT
C325 12333 010074 AND MSK0 IN (A)
C326 12334 040001 ADA 1 COMBINE A AND B
C327 12335 065062R LDB B1+1 PARAMETERS OF B1
C328 12336 015063R JSB COMPR COMPARE ROW AND COL
C329* DIMENSIONS ARE COMPATIBLE
C330* M,N ARE STORED IN T3,T4
C331* SAVE B2 AS .DESTROYED IN
C332 12337 062063R LDA B2 MULT
C333 12340 073275R STA T5
C334 12341 063273R LDA T3 SET
C335 12342 003004 CMA,INA ROW
C336 12343 073301R STA T9 COUNTER
C337 12344 063276R MULT4 LDA T6
C338 12345 003004 CMA,INA
C339 12346 073302R STA T10 SET COUNTER
C340 12347 063275R LDA T5
C341 12350 072063R STA B2 RESTORE BASE ADDRESS B2
C342 12351 002400 MULT3 CLA
C343 12352 073303R STA T11 COUNTER FOR B2. INCR BY
C344* 2*P AND POINTS TO NEXT TERM
C345* IN COL TO BE MULTIPLIED
C346 12353 073304R STA T12 COUNTER FOR B1. INCR BY 2
C347* AND POINTS TO NEXT TERM
C348* IN ROW TO BE MULTIPLIED
C349 12354 005400 CLB
C350 12355 017342R JSB DDST CLEAR TO ZERO
C351 12356 000065R DEF B3

```

|       |       |         |       |            |                           |
|-------|-------|---------|-------|------------|---------------------------|
| C352  | 12357 | 065061R | MULT2 | LDB B1     | COMPUTE PROD OF ONE TERM  |
| C353  | 12360 | 047304R |       | ADB T12    | IN ROW BY ONE TERM IN COL |
| C354  | 12361 | 077310R |       | STB T18    |                           |
| C355  | 12362 | 065063R |       | LDB B2     |                           |
| C356  | 12363 | 047303R |       | ADB T11    |                           |
| C357  | 12364 | 069001  |       | LDA B      |                           |
| C358  | 12365 | 017505R |       | JSB FTHOP  |                           |
| C359  | 12366 | 017421R |       | JSB .FMP.  |                           |
| C360  | 12367 | 113310R |       | DEF T18,I  |                           |
| C361  | 12370 | 017403R |       | JSB .FAD.  | COMPUTES RUNNING SUM      |
| C362  | 12371 | 109065R |       | DEF B3,I   |                           |
| C363  | 12372 | 017342R |       | JSB DDST   |                           |
| C364  | 12373 | 000065R |       | DEF B3     |                           |
| C365  | 12374 | 037304R |       | ISZ T12    | SELECT NEXT TERM IN ROW   |
| C366  | 12375 | 037304R |       | ISZ T12    |                           |
| C367  | 12376 | 063276R |       | LDA T6     | SELECT NEXT TERM IN COL   |
| C368  | 12377 | 001000  |       | ALS        |                           |
| C369  | 12400 | 043303R |       | ADA T11    |                           |
| C370  | 12401 | 073303R |       | STA T11    |                           |
| C371* |       |         |       |            | TEST IF HAVE MULT ONE ROW |
| C372* |       |         |       |            | BY ONE COLUMN             |
| C373  | 12402 | 063274R |       | LDA T4     |                           |
| C374  | 12403 | 001000  |       | ALS        |                           |
| C375  | 12404 | 053304R |       | CPA T12    |                           |
| C376  | 12405 | 025407R |       | JMP *+2    |                           |
| C377  | 12406 | 025357R |       | JMP MULT2  | MULT AND ADD IN NEXT TERM |
| C378* |       |         |       |            | SUMMATION OF PRODUCTS FOR |
| C379* |       |         |       |            | ONE TERM OF B3 IS DONE    |
| C380* |       |         |       |            | MULT SAME ROW BY NEXT COL |
| C381  | 12407 | 035065R |       | ISZ B3     | INCR RECEIVING MAT        |
| C382  | 12410 | 035065R |       | ISZ B3     |                           |
| C383  | 12411 | 035063R |       | ISZ B2     | BASE ADDRESS OF NEXT COL  |
| C384  | 12412 | 035063R |       | ISZ B2     |                           |
| C385* |       |         |       |            | TEST IF HAVE MULT ONE ROW |
| C386* |       |         |       |            | BY ALL COLUMNS            |
| C387  | 12413 | 037302R |       | ISZ T10    | SKIP IF INNERPRODUCT DONE |
| C388  | 12414 | 025351R |       | JMP MULT3  | COMPUTE SAME ROW*NEXT COL |
| C389* |       |         |       |            | SELECT NEXT ROW           |
| C390  | 12415 | 063274R |       | LDA T4     |                           |
| C391  | 12416 | 001000  |       | ALS        |                           |
| C392  | 12417 | 042061R |       | ADA B1     |                           |
| C393  | 12420 | 072061R |       | STA B1     | ADDRESS OF NEXT ROW       |
| C394  | 12421 | 037301R |       | ISZ T9     |                           |
| C395  | 12422 | 025344R |       | JMP MULT4  | MULT ROW BY ALL COLUMNS   |
| C396  | 12423 | 125314R |       | JMP MULT,I | EXIT TO MAIN PROGRAM      |

```

C398*
C399*****
C400**** SUBROUTINE MATRIX INVERT ****
C401*****
C402*OPERATION OF FORM MAT B3 = INV B1 *
C403*B1,B3 ARE ADDRESSES OF BASE ADDRESS OF *
C404*MATRIX TO BE INVERTED AND RECEIVING MATRIX *
C405*RESPECTIVELY. B2 IS REDUNDANT. METHOD USED *
C406*IS GAUSSIAN ELIMINATION WITH COLUMN *
C407*PIVOTING *
C408*****
C409*
C410 12424 000000 LINV NOP SUBROUTINE MATRIX INVERT
C411 12425 015076R JSB LCHK2 TEST B1 FOR UNASSIGNED TERMS
C412 12426 062062R LDA B1+1 DIMENSIONS OF MATRIX B1
C413 12427 065066R LDB B3+1 DIMENSIONS OF MATRIX B3
C414 12430 015063R JSB COMPR CHECK DIMENSIONS
C415* ROW AND COL VALUES T3,T4
C416* MAKE COPY OF MATRIX B1
C417* IN FREE CORE
C418 12431 062065R LDA B3 SAVE
C419 12432 073305R STA T13 B3
C420 12433 062062R LLA B1+1 COMPUTE SIZE
C421 12434 017130R JSB MDIM OF MATRIX
C422 12435 003004 CMA,INA
C423 12436 001100 ARS SAVE
C424 12437 073272R STA T2 ELEMENT
C425 12440 001000 ALS COUNTER
C426 12441 065007R LDB FDISK SAVE
C427 12442 005004 INB ADDRESS OF
C428 12443 075063R STB B2 FREE CORE
C429 12444 075065R STB B3
C430 12445 007004 CMB,INB COMPUTE SIZE OF
C431 12446 045003R ADB LWAM FREE CORE AREA
C432 12447 040001 ADA 1 ENOUGH
C433 12450 002020 SSA CORE LEFT?
C434 12451 027240R JMP E1 NO
C435 12452 015151R JSB REPLC YES, COPY SOURCE MATRIX
C436 12453 063305R LDA T13 RESTORE
C437 12454 072065R STA B3 B3
C438 12455 015220R JSB LIDN SET DESTINATION TO IDENTITY
C439 12456 063305R LDA T13 RESTORE ITS
C440 12457 072065R STA B3 BASE ADDRESS
C441 12460 002400 CLA INITIALIZE
C442 12461 073304R STA T12 MAXIMUM
C443 12462 073305R STA T13 ELEMENT
C444 12463 062063R LDA B2 COPY B2 INTO B1 AS
C445 12464 072061R STA B1 B2 NEEDED LATER
C446 12465 017322R LIN11 JSB DDLD LOAD
C447 12466 000061R DEF B1 NEXT
C448 12467 035061R ISZ B1 ELEMENT
C449 12470 035061R ISZ B1
C450 12471 035061R ISZ B1
C451 12472 002020 SSA GET ABSOLUTE VALUE
C452 12473 017217R JSB ARINV IF NUMBER IS NEGATIVE

```



|       |       |         |                |                                 |
|-------|-------|---------|----------------|---------------------------------|
| 0453  | 12474 | 073310R | STA T18        | SAVE NUMBER                     |
| 0454  | 12475 | 077311R | STB T19        |                                 |
| 0455  | 12476 | 015003X | FSB T12        | SUBTRACT EXISTING MAX. VALUE    |
|       | 12477 | 013304R |                |                                 |
| 0456  | 12500 | 002020  | SSA            | SKIP AND SWAP IF POSITIVE       |
| 0457  | 12501 | 025506R | JMP LIN10      |                                 |
| 0458  | 12502 | 063310R | LDA T18        | SWAP                            |
| 0459  | 12503 | 067311R | LDB T19        |                                 |
| 0460  | 12504 | 073304R | STA T12        |                                 |
| 0461  | 12505 | 077305R | STB T13        |                                 |
| 0462  | 12506 | 037272R | LIN10 ISZ T2   | ALL ELEMENTS EXHAUSTED?         |
| 0463  | 12507 | 025465R | JMP LIN11      | NO                              |
| 0464  | 12510 | 063304R | LDA T12        | COMPUTE RELATIVE TOLERANCE      |
| 0465  | 12511 | 067305R | LDB T13        | TOL=ABSOLUTE TOL * MAX VALUE    |
| 0466  | 12512 | 015001X | FMP T16        | ABSOLUTE TOLERANCE              |
|       | 12513 | 013306R |                |                                 |
| 0467  | 12514 | 072057R | STA MLBX1      | RELATIVE                        |
| 0468  | 12515 | 075060R | STB MLBX1+1    | TOLERANCE                       |
| 0469  | 12516 | 002400  | CLA            | INITIALIZE PIVOT                |
| 0470  | 12517 | 073312R | STA LPIV       |                                 |
| 0471  | 12520 | 037274R | ISZ T4         | REQUIRE CONSTANT (ROW+1)        |
| 0472  | 12521 | 037312R | LINV1 ISZ LPIV | SELECT NEXT PIVOT               |
| 0473  | 12522 | 063312R | LDA LPIV       | TEST IF HAVE PROCESSED          |
| 0474  | 12523 | 053274R | CPA T4         | LAST PIVOT                      |
| 0475  | 12524 | 125424R | JMP LINV,I     | NORMAL EXIT TO MAIN PROG        |
| 0476* |       |         |                | SCAN PIVOTAL COLUMN FOR         |
| 0477* |       |         |                | LARGEST ELEMENT                 |
| 0478  | 12525 | 063312R | LDA LPIV       | COMPUTE ADDRESS OF PIVOT        |
| 0479  | 12526 | 067312R | LDB LPIV       | COLUMN USING ROUTINE LWHR       |
| 0480  | 12527 | 073272R | STA T2         | ROW COUNTER                     |
| 0481  | 12530 | 017052R | JSB LWHR       | ON RETURN, ADDRESS IN A         |
| 0482  | 12531 | 073271R | STA T1         |                                 |
| 0483  | 12532 | 002400  | CLA            |                                 |
| 0484  | 12533 | 073304R | STA T12        | T12,T13 IS STORE                |
| 0485  | 12534 | 073305R | STA T13        | FOR GREATEST VALUE              |
| 0486  | 12535 | 017322R | LINV2 JSB UDL0 | LOAD FP NUMBER                  |
| 0487  | 12536 | 013271R | DEF T1         |                                 |
| 0488  | 12537 | 002020  | SSA            | OBTAIN ABSOLUTE VALUE           |
| 0489  | 12540 | 017217R | JSB ARINV      | IF NUMBER IS NEGATIVE           |
| 0490  | 12541 | 073310R | STA T18        | STORE VALUE OF FP NUMBER        |
| 0491  | 12542 | 077311R | STB T19        |                                 |
| 0492  | 12543 | 015003X | FSB T12        | SUBTRACT EXISTING LARGEST VALUE |
|       | 12544 | 013304R |                |                                 |
| 0493  | 12545 | 002020  | SSA            | SKIP AND SWAP IF POSITIVE       |
| 0494  | 12546 | 025555R | JMP LINV7      | T2 STILL CONTAINS MAX VALUE     |
| 0495  | 12547 | 063310R | LDA T18        | STORE NEW MAX VALUE             |
| 0496  | 12550 | 067311R | LDB T19        |                                 |
| 0497  | 12551 | 073304R | STA T12        |                                 |
| 0498  | 12552 | 077305R | STB T13        |                                 |
| 0499  | 12553 | 063272R | LDA T2         | SET T5 TO POSITION IN           |
| 0500  | 12554 | 073275R | STA T5         | COLUMN OF MAX VALUE             |
| 0501  | 12555 | 037272R | LINV7 ISZ T2   |                                 |
| 0502  | 12556 | 063272R | LDA T2         | TEST FOR LAST TERM IN COL       |
| 0503  | 12557 | 053274R | CPA T4         |                                 |
| 0504  | 12560 | 025566R | JMP LINV8      | SWAP ROWS                       |

|       |       |         |                |                                |
|-------|-------|---------|----------------|--------------------------------|
| C505  | 12561 | 063273R | LDA T3         | COMPUTE                        |
| C506  | 12562 | 001000  | ALS            | NEXT ADDRESS                   |
| C507  | 12563 | 043271R | ADA T1         | IN PIVOT                       |
| C508  | 12564 | 073271R | STA T1         | COLUMN                         |
| C509  | 12565 | 025535R | JMP LINV2      | SELECT NEXT TERM               |
| C510* |       |         |                | SWAP ROWS LPIV AND T5          |
| C511  | 12566 | 063312R | LINV8 LDA LPIV | COMPUTE ADDRESS                |
| C512  | 12567 | 005404  | CLB,INB        | OF PIVOTAL ROW                 |
| C513  | 12570 | 017052R | JSB LWHR       |                                |
| C514  | 12571 | 073271R | STA T1         | ADDRESS OF PIVOTAL ROW         |
| C515  | 12572 | 063275R | LDA T5         |                                |
| C516  | 12573 | 005404  | CLB,INB        |                                |
| C517  | 12574 | 017052R | JSB LWHR       |                                |
| C518  | 12575 | 073272R | STA T2         | ADDR OF ROW TO BE SWAPPED      |
| C519  | 12576 | 063312R | LDA LPIV       |                                |
| C520  | 12577 | 005404  | CLB,INB        | COMPUTE ADDRESS OF             |
| C521  | 12600 | 017064R | JSB LWHR2      | PIVOTAL ROW IN I-MATRIX        |
| C522  | 12601 | 073301R | STA T9         |                                |
| C523  | 12602 | 073302R | STA T10        | KEEP COPY                      |
| C524  | 12603 | 063275R | LDA T5         |                                |
| C525  | 12604 | 005404  | CLB,INB        | COMPUTE ADDR OF ROW TO         |
| C526  | 12605 | 017064R | JSB LWHR2      | BE SWAPPED IN I-MATRIX         |
| C527  | 12606 | 073303R | STA T11        |                                |
| C528  | 12607 | 063273R | LDA T3         |                                |
| C529  | 12610 | 003004  | CMA,INA        |                                |
| C530  | 12611 | 073304R | STA T12        | COUNTER FOR TERMS IN A ROW     |
| C531  | 12612 | 017322R | LINV3 JSB DDLD | SWAP ONE ELEMENT OF ROW        |
| C532  | 12613 | 013271R | DEF T1         |                                |
| C533  | 12614 | 073310R | STA T18        |                                |
| C534  | 12615 | 077311R | STB T19        |                                |
| C535  | 12616 | 017322R | JSB DDLD       |                                |
| C536  | 12617 | 013272R | DEF T2         |                                |
| C537  | 12620 | 017342R | JSB DDST       |                                |
| C538  | 12621 | 013271R | DEF T1         |                                |
| C539  | 12622 | 037271R | ISZ T1         |                                |
| C540  | 12623 | 037271R | ISZ T1         |                                |
| C541  | 12624 | 063310R | LDA T18        |                                |
| C542  | 12625 | 067311R | LDB T19        |                                |
| C543  | 12626 | 017342R | JSB DDST       |                                |
| C544  | 12627 | 013272R | DEF T2         |                                |
| C545  | 12630 | 037272R | ISZ T2         |                                |
| C546  | 12631 | 037272R | ISZ T2         |                                |
| C547  | 12632 | 017322R | JSB DDLD       | SWAP 1 ELEMENT OF ROW OF I MAT |
| C548  | 12633 | 013301R | DEF T9         |                                |
| C549  | 12634 | 073310R | STA T18        |                                |
| C550  | 12635 | 077311R | STB T19        |                                |
| C551  | 12636 | 017322R | JSB DDLD       |                                |
| C552  | 12637 | 013303R | DEF T11        |                                |
| C553  | 12640 | 017342R | JSB DDST       |                                |
| C554  | 12641 | 013301R | DEF T9         |                                |
| C555  | 12642 | 037301R | ISZ T9         |                                |
| C556  | 12643 | 037301R | ISZ T9         |                                |
| C557  | 12644 | 063310R | LDA T18        |                                |
| C558  | 12645 | 067311R | LDB T19        |                                |
| C559  | 12646 | 017342R | JSB DDST       |                                |

|       |       |         |               |                            |
|-------|-------|---------|---------------|----------------------------|
| 0560  | 12647 | 013303R | DEF T11       |                            |
| 0561  | 12650 | 037303R | ISZ T11       |                            |
| 0562  | 12651 | 037303R | ISZ T11       |                            |
| 0563  | 12652 | 037304R | ISZ T12       | SKIP IF DONE               |
| 0564  | 12653 | 025612R | JMP LINV3     | SWAP NEXT ELEMENT          |
| 0565* |       |         |               | HAVE LARGEST ELEMENT IN    |
| 0566* |       |         |               | PIVOTAL POSITION. FIND     |
| 0567* |       |         |               | VALUE AND TEST TO ZERO     |
| 0568* |       |         |               | FOR SINGULAR MATRIX        |
| 0569  | 12654 | 063312R | LDA LPIV      | COMPUTE                    |
| 0570  | 12655 | 067312R | LDB LPIV      | ADDRESS OF                 |
| 0571  | 12656 | 017052R | JSB LWHR      | PIVOT                      |
| 0572  | 12657 | 073271R | STA T1        | ELEMENT                    |
| 0573  | 12660 | 017322R | JSB DDLD      | PIVOT VALUE                |
| 0574  | 12661 | 013271R | DEF T1        |                            |
| 0575  | 12662 | 002020  | SSA           | OBTAIN ABSOLUTE VALUE      |
| 0576  | 12663 | 017217R | JSB ARINV     | IF NUMBER IS NEGATIVE      |
| 0577  | 12664 | 016003X | FSB MLBX1     | SUBTRACT TOLERANCE AND     |
|       | 12665 | 000057R |               |                            |
| 0578  | 12666 | 002020  | SSA           | COMPARE TO ZERO            |
| 0579  | 12667 | 016274R | JSB ERROR     | PRINT 'NEARLY SING MATRIX' |
| 0580* |       |         |               | DIVIDE PIVOT ROW AND ROW   |
| 0581* |       |         |               | IN I-MAT BY PIVOT VALUE    |
| 0582  | 12670 | 063271R | LDUM1 LDA T1  | ADDRESS OF PIOT ELEMENT    |
| 0583  | 12671 | 073272R | STA T2        |                            |
| 0584  | 12672 | 062261R | LDA HONE      | LOAD                       |
| 0585  | 12673 | 064055  | LDB .2        | 1.0                        |
| 0586  | 12674 | 017430R | JSB .FDV.     |                            |
| 0587  | 12675 | 113271R | DEF T1,I      |                            |
| 0588  | 12676 | 073310R | STA T18       | INVERSE OF PIVOT           |
| 0589  | 12677 | 077311R | SIB T19       |                            |
| 0590* |       |         |               | MULT ROW BY 1/PIVOT        |
| 0591* |       |         |               | STARTING AT PIVOT+1        |
| 0592  | 12700 | 063312R | LDA LPIV      |                            |
| 0593  | 12701 | 073303R | STA T11       | COUNTER FOR ROW            |
| 0594  | 12702 | 037303R | LINV6 ISZ T11 | INCREMENT COUNTER          |
| 0595  | 12703 | 063303R | LDA T11       |                            |
| 0596  | 12704 | 053274R | CPA T4        | TEST FOR END OF ROW        |
| 0597  | 12705 | 025717R | JMP LIN12     |                            |
| 0598  | 12706 | 057272R | ISZ T2        | ADDRESS OF NEXT ELEMENT    |
| 0599  | 12707 | 057272R | ISZ T2        |                            |
| 0600  | 12710 | 017322R | JSB DDLD      |                            |
| 0601  | 12711 | 013272R | DEF T2        |                            |
| 0602  | 12712 | 016001X | FMP T18       |                            |
|       | 12713 | 013310R |               |                            |
| 0603  | 12714 | 017342R | JSB DDST      |                            |
| 0604  | 12715 | 013272R | DEF T2        |                            |
| 0605  | 12716 | 025702R | JMP LINV6     |                            |
| 0606* |       |         |               | MULT ROW IN I-MATRIX BY    |
| 0607* |       |         |               | 1/PIVOT. SKIP IF ELEMENT=0 |
| 0608  | 12717 | 063302R | LIN12 LDA T10 | ADDRESS OF PIVOT ROW       |
| 0609  | 12720 | 073275R | STA T5        | IN I-MATRIX                |
| 0610  | 12721 | 063273R | LDA T3        |                            |
| 0611  | 12722 | 003004  | CMA,1NA SET   |                            |
| 0612  | 12723 | 073303R | STA T11       | ROW COUNTER                |

|       |       |         |       |           |                                  |
|-------|-------|---------|-------|-----------|----------------------------------|
| 0613  | 12724 | 017322R | LIN13 | JSB DDLD  |                                  |
| 0614  | 12725 | 013275R |       | DEF T5    |                                  |
| 0615  | 12726 | 002005  |       | SZA,RSS   | SKIP MULTIPLICATION IF ZERO      |
| 0616  | 12727 | 006002  |       | SZB       |                                  |
| 0617  | 12730 | 026732R |       | JMP *+2   | NOT ZERO                         |
| 0618  | 12731 | 026736R |       | JMP LIN14 | ZERO                             |
| 0619  | 12732 | 016001X |       | FMP T18   |                                  |
|       | 12733 | 013310R |       |           |                                  |
| 0620  | 12734 | 017342R |       | JSB DDST  |                                  |
| 0621  | 12735 | 013275R |       | DEF T5    |                                  |
| 0622  | 12736 | 037275R | LIN14 | ISZ T5    | NEXT ELEMENT IN I-MATRIX         |
| 0623  | 12737 | 037275R |       | ISZ T5    |                                  |
| 0624  | 12740 | 037303R |       | ISZ T11   | DONE?                            |
| 0625  | 12741 | 026724R |       | JMP LIN13 | NO                               |
| 0626* |       |         |       |           | PERFORM ROW MANIPULATIONS        |
| 0627* |       |         |       |           | AND SUBTRACTIONS TO REDUCE       |
| 0628* |       |         |       |           | PIVOT COLUMN TO ZERO             |
| 0629  | 12742 | 002400  |       | CLA       |                                  |
| 0630  | 12743 | 072061R |       | STA B1    |                                  |
| 0631  | 12744 | 036061R | LINV4 | ISZ B1    | SELECT NEXT ROW                  |
| 0632  | 12745 | 062061R |       | LDA B1    |                                  |
| 0633  | 12746 | 053274R |       | CPA T4    | TEST FOR LAST ROW                |
| 0634  | 12747 | 026521R |       | JMP LINV1 | SELECT NEXT PIVOT                |
| 0635  | 12750 | 053312R |       | CPA LPIV  | TEST TO SKIP PIVOTAL ROW         |
| 0636  | 12751 | 026744R |       | JMP LINV4 | SKIP PIVOTAL ROW                 |
| 0637  | 12752 | 062061R |       | LDA B1    |                                  |
| 0638  | 12753 | 006404  |       | CLB,INB   |                                  |
| 0639  | 12754 | 017064R |       | JSB LWHR2 | ADDRESS OF ROW TO BE TRANSFORMED |
| 0640  | 12755 | 073303R |       | STA T11   | IN I-MATRIX                      |
| 0641* |       |         |       |           | COMPUTE MULTIPLIER WHICH         |
| 0642* |       |         |       |           | IS THAT ELEMENT IN ROW TO        |
| 0643* |       |         |       |           | BE TRANSFORMED WHICH LIES        |
| 0644* |       |         |       |           | IN THE PIVOTAL COLUMN            |
| 0645  | 12756 | 062061R |       | LDA B1    |                                  |
| 0646  | 12757 | 067312R |       | LDB LPIV  |                                  |
| 0647  | 12760 | 017052R |       | JSB LWHR  |                                  |
| 0648  | 12761 | 073301R |       | STA T9    | SAVE ADDRESS                     |
| 0649  | 12762 | 017505R |       | JSB FTHOP |                                  |
| 0650  | 12763 | 073277R |       | STA T7    | VALUE OF MULTIPLIER              |
| 0651  | 12764 | 077300R |       | STB T8    |                                  |
| 0652* |       |         |       |           | DO ELIMINATION OF ROWS IN        |
| 0653* |       |         |       |           | ORIGINAL MATRIX. START AT        |
| 0654* |       |         |       |           | COLUMN LPIV+1                    |
| 0655  | 12765 | 063312R |       | LDA LPIV  |                                  |
| 0656  | 12766 | 073305R |       | STA T13   | COUNTER                          |
| 0657  | 12767 | 063271R |       | LDA T1    |                                  |
| 0658  | 12770 | 073272R |       | STA T2    |                                  |
| 0659  | 12771 | 037305R | LINV5 | ISZ T13   |                                  |
| 0660  | 12772 | 063305R |       | LDA T13   |                                  |
| 0661  | 12773 | 053274R |       | CPA T4    | TEST FOR LAST TERM IN ROW        |
| 0662  | 12774 | 027016R |       | JMP LIN15 |                                  |
| 0663  | 12775 | 037301R |       | ISZ T9    | T9 IS ADDRESS OF                 |
| 0664  | 12776 | 037301R |       | ISZ T9    | ELEMENT TO BE CHANGED            |
| 0665  | 12777 | 037272R |       | ISZ T2    | T2 IS ADDR OF CORRESPONDING      |
| 0666  | 13000 | 037272R |       | ISZ T2    | ELEMENT IN PIVOTAL ROW           |

```

0667 15001 063277R LDA T7
0668 15002 067500R LDB T8
0669 15003 017421R JSB .FMP.
0670 15004 113272R DEF T2,I
0671 15005 073310R STA T18 MULTIPLIER*VALUE IN
0001 15006 077311R STB T19 PIVOT ROW
0002 15007 017522R JSB DDLD
0003 15010 013301R DEF T9
0004 15011 016003X FSB T18
      15012 013310R
0005 15013 017342R JSB DDST TRANSFORM ELEMENT
0006 15014 013301R DEF T9
0007 15015 026771R JMP LINV5 SELECT NEXT TERM
0008* DO ELIMINATION OF ROWS IN
0009* IDENTITY MATRIX. START AT
0010* BEGINNING OF ROW AND LEAVE
0011* ELEMENT UNCHANGED WHEN ZERO
0012* IN PIVOTAL ROW.
0013 15016 063302R LIN15 LDA T10 ADDRESS OF
0014 15017 073275R STA T5 PIVOTAL ROW
0015 15020 063273R LDA T3
0016 15021 003004 CMA,INA SET
0017 15022 073305R STA T13 COUNTER
0018 15023 017322R LIN18 JSB DDLD
0019 15024 013275R DEF T5
0020 15025 037275R ISZ T5
0021 15026 037275R ISZ T5
0022 15027 002003 SZA,RSS SKIP IF ZERO
0023 15030 006002 SZB
0024 15031 027033R JMP *+2 NOT ZERO
0025 15032 027045R JMP LIN17 ZERO
0026 15033 016001X FMP T7 MULTIPLY BY THE MULTIPLIER
      15034 013277R
0027 15035 073310R STA T18
0028 15036 077311R STB T19
0029 15037 017322R JSB DDLD
0030 15040 013303R DEF T11
0031 15041 016003X FSB T18
      15042 013310R
0032 15043 017342R JSB DDST
0033 15044 013303R DEF T11
0034 15045 037303R LIN17 ISZ T11
0035 15046 037303R ISZ T11
0036 15047 037305R ISZ T13
0037 15050 027023R JMP LIN18 SELECT NEXT TERM
0038 15051 026744R JMP LINV4 ELIMINATE NEXT ROW
0039*
0040*
0041*****
0042***** SUBROUTINE LWHR *****
0043*****
0044*SUBROUTINE COMPUTES ADDRESS OF AN ELEMENT *
0045*IN MATRIX GIVEN BY B2. ROW AND COL VALUES *
0046*ARE SUPPLIED IN A,B. ADDRESS IS LEFT IN A *
0047*ENTRY LWHR2 COMPUTES ADDR IN MAT B3 *
```

```

C048*****
C049*
C050 13052 000000 LWHR NOP
C051 13053 077277R STB T7 SAVE COLUMN #
C052 13054 040052 ADA M1
C053 13055 100200 MPY T3 (A-1)*T3
      13056 013273R
C054 13057 043277R ADA T7
C055 13060 040052 ADA M1 +(B-1)
C056 13061 001000 ALS
C057 13062 042063R ADA B2 DDR=B2+2((A-1)*T3+(B-1))
C058 13063 127052R JMP LWHR,I
C059 13064 000000 LWHR2 NOP
C060 13065 077277R STB T7
C061 13066 040052 ADA M1
C062 13067 100200 MPY T3
      13070 013273R
C063 13071 043277R ADA T7
C064 13072 040052 ADA M1
C065 13073 001000 ALS
C066 13074 042063R ADA B3
C067 13075 127064R JMP LWHR2,I
C068*
C069**
C070*** RETRIEVE AND STORE SUB-PROGRAM PARAMETERS0***
C071**
C072*
C073 13076 000000 SENTER NOP
C074 13077 073121R STA SORCE
C075 13100 167076R LDB SENTER,I
C076 13101 077122R STB DEST
C077 13102 007004 CMB,INB
C078 13103 047076R ADB SENTER
C079 13104 044051 ADB M2
C080 13105 007004 CMB,INB
C081 13106 077123R STB CNTR
C082 13107 037076R ISZ SENTER
C083 13110 163121R .LOOP LDA SORCE,I
C084 13111 173122R STA DEST,I
C085 13112 063121R LDA SORCE
C086 13113 040052 ADA M1
C087 13114 073121R STA SORCE
C088 13115 037122R ISZ DEST
C089 13116 037123R ISZ CNTR
C090 13117 027110R JMP .LOOP
C091 13120 127076R JMP SENTER,I
C092 13121 000000 SORCE NOP
C093 13122 000000 DEST NOP
C094 13123 000000 CNTR NOP
C095 13124 000000 EXECR NOP GET RECORD FROM CRT/TICKY-TICKY
C096 13125 077260R STB BUFFER
C097 13126 073267R STA BUFFL
C098 13127 063124R LDA EXECR
C099 13130 073270R STA RET
C100 13131 060054 LDA .1

```

```

C101 13132 073265R STA RCODE
C102 13133 063136R LDA 0401
C103 13134 073266R STA CONWD
C104 13135 027254R JMP IEXEC
C105 13136 000401 0401 OCT 401
C106 13137 000000 EXECUT NOP GET RECORD FROM PHOTO READER
C107 13140 077260R STB BUFFER
C108 13141 003004 CMA,INA
C109 13142 073267R STA BUFFL
C110 13143 063137R LDA EXECUT
C111 13144 073270R STA RET
C112 13145 060054 LDA .1
C113 13146 073265R STA RCODE
C114 13147 060060 LDA .5
C115 13150 073266R STA CONWD
C116 13151 027254R JMP IEXEC
C117 13152 000000 EXECUS NOP SET END OF TAPE
C118 13153 016005X JSB EXEC
C119 13154 013157R DEF **3
C120 13155 000056 DEF .3
C121 13156 013160R DEF CON2
C122 13157 127152R JMP EXECUS,I
C123 13160 000705 CON2 OCT 000705
C124*
C125*** ENTER WITH CHARACTER COUNT IN THE 'A' REGISTER
C126*** AND THE BUFFER ADDRESS IN THE 'B' REGISTER.
C127*
C128 13161 000000 EXECW NOP WRITE RECORD ON CRT
C129 13162 077260R STB BUFFER
C130 13163 002021 SSA,RSS
C131 13164 003004 CMA,INA
C132 13165 073267R STA BUFFL
C133 13166 063161R LDA EXECW
C134 13167 073270R STA RET
C135 13170 060055 LDA .2
C136 13171 073265R STA RCODE
C137 13172 102501 LIA 01
C138 13173 012261R AND HALF
C139 13174 067264R LDB XIT
C140 13175 006021 SSB,RSS
C141 13176 027201R JMP **3
C142 13177 002002 SZA
C143 13200 027575R JMP RDYPT
C144 13201 102501 LIA 01
C145 13202 012263R AND MNEG
C146 13203 002002 SZA
C147 13204 060061 LDA .6
C148 13205 002003 SZA,RSS
C149 13206 060054 LDA .1
C150 13207 073266R STA CONWD
C151 13210 027254R JMP IEXEC
C152*
C153*** (ADDED 7-APR-71)
C154*
C155 13211 000000 LPUN NOP

```

```

0156 13212 006002      SZB
0157 13213 027232R     JMP LPUN1
0158 13214 062252R     LDA D133
0159 13215 073231R     STA CNTH0
0160 13216 016005X LPUN3 JSB EXEC      PUNCH RECORD ON H.S. PUNCH
0161 13217 013224R     DEF **5
0162 13220 000055      DEF .2
0163 13221 013227R     DEF CON1
0164 13222 013230R     DEF BUFR1
0165 13223 000054      DEF .1
0166 13224 037231R     ISZ CNTH0
0167 13225 027216R     JMP LPUN3
0168 13226 127211R     JMP LPUN,I
0169 13227 000104      CON1 OCT 104
0170 13230 000000      BUFR1 NOP
0171 13231 000000      CNTH0 NOP
0172 13232 077260R LPUN1 STB BUFFER
0173 13233 003004      CMA,INA
0174 13234 073267R     STA BUFL
0175 13235 063211R     LDA LPUN
0176 13236 073270R     STA RET
0177 13237 060057      LDA .4
0178 13240 073266R     STA CONWD
0179 13241 027252R     JMP LPUN2
0180 13242 000000      EXECP NOP      LIST RECORD ON LINE PRINTER
0181 13243 077260R     STB BUFFER
0182 13244 003004      CMA,INA
0183 13245 073267R     STA BUFL
0184 13246 063242R     LDA EXECP
0185 13247 073270R     STA RET
0186 13250 060061      LDA .6
0187 13251 073266R     STA CONWD
0188 13252 060055      LPUN2 LDA .2
0189 13253 073265R     STA RCODE
0190          EXT EXEC
0191 13254 016005X IEXEC JSB EXEC
0192 13255 013262R     DEF **5
0193 13256 013265R     DEF RCODE
0194 13257 013266R     DEF CONWD
0195 13260 000000      BUFFER NOP
0196 13261 013267R     DEF BUFL
0197 13262 060001      LDA 1
0198 13263 127270R     JMP RET,I
0199*
0200*
0201 13264 000000      XIT  BSS 1
0202 13265 000000      RCODE BSS 1
0203 13266 000000      CONWD BSS 1
0204 13267 000000      BUFL  BSS 1
0205 13270 000000      RET   BSS 1
0206*
0207*
0208*****
0209*          CONSTANTS          *
0210*****

```



```

0211*
0212 13271 000000 T1 BSS 1      TEMPORARY CONSTANTS
0213 13272 000000 T2 BSS 1
0214 13273 000000 T3 BSS 1
0215 13274 000000 T4 BSS 1
0216 13275 000000 T5 BSS 1
0217 13276 000000 T6 BSS 1
0218 13277 000000 T7 BSS 1
0219 13300 000000 T8 BSS 1
0220 13301 000000 T9 BSS 1
0221 13302 000000 T10 BSS 1
0222 13303 000000 T11 BSS 1
0223 13304 000000 T12 BSS 1
0224 13305 000000 T13 BSS 1
0225 13306 041433 T16 DEC +1E-6  ABSOLUTE TOLERANCE
    13307 157733
0226 13310 000000 T18 BSS 1
0227 13311 000000 T19 BSS 1
0228 13312 000000 LPIV BSS 1
0229 13313 000000 FINIS BSS 700
0230 14607 000000 LWAMA BSS 1
0231 14610 000000 SBUF BSS 97
0232 14751 000000 SYMTB BSS 64
0233**
0234*** PERFORM LDA 1,I
0235**
0236 15051 000000 LDBI NOP
0237 15052 060001 LDA B
0238 15053 017204R JSB DREAD
0239 15054 127051R JMP LDBI,I
0240**
0241*** PERFORM STA 1,I
0242**
0243 15055 000000 STBI NOP
0244 15056 077130R STB TMP2
0245 15057 017151R JSB DSTOR
0246 15060 015130R DEF TMP2
0247 15061 127055R JMP STBI,I
0248**
0249*** PERFORM LDA TEMPS,I
0250**
0251 15062 000000 LDIMP NOP
0252 15063 062045R LDA TEMPS
0253 15064 017204R JSB DREAD
0254 15065 127062R JMP LDIMP,I

```

## DISK BUFFERING ROUTINES

0256\*

0257\*\*\*\*\*

0258\*\*\* DISK BUFFER SUBROUTINES \*\*\*\*\*

0259\*\*\*\*\*

0260\* ADDRESS CONVERSION SUBROUTINE

0261\* ENTER WITH ADDRESS IN A REG

0262\*

0263 15066 000000 AC0N NOP

0264 15067 005400 CLB

0265 15070 077121R STB SCNT SET SECTOR COUNT TO ZERO

0266 15071 065011C LDB FTRAK

0267 15072 077122R STB TCNT SET TRACK COUNT TO START OF W.A.

0268 15073 002020 SSA ADDR &gt; 32767

0269 15074 015274R JSB ERROR NO, ERROR!

0270 15075 043126R DIA1 ADA M3072 COMPUTE TRACK ADDR.

0271 15076 002021 SSA,RSS

0272 15077 027105R JMP INCTR

0273 15100 043124R ADA .3072

0274 15101 043125R DIA2 ADA M128 COMPUTE SECTOR ADDR.

0275 15102 002021 SSA,RSS

0276 15103 027107R JMP INCSC

0277 15104 127066R JMP AC0N,I

0278\*

0279\*

0280 15105 037122R INCTR ISZ TCNT

0281 15106 027075R JMP DIA1

0282\*

0283 15107 037121R INCSC ISZ SCNT

0284 15110 067121R LDB SCNT

0285 15111 057135R CPH SIZE

0286 15112 017114R JSB ITRK

0287 15113 027101R JMP DIA2

0288\*

0289 15114 000000 ITRK NOP

0290 15115 037122R ISZ TCNT

0291 15116 005400 CLB

0292 15117 077121R STB SCNT

0293 15120 127114R JMP ITRK,I

0294\*

0295\*

0296 15121 000000 SCNT BSS 1

0297 15122 000000 TCNT BSS 1

0298 15123 000000 TMP BSS 1

0299 00172 .128 EQU B200

0300 15124 005000 .3072 DEC 3072

0301 15125 177600 M128 DEC -128

0302 15126 172900 M3072 DEC -3072

0303 15127 000000 TMP1 BSS 1

0304 15130 000000 TMP2 BSS 2

0305 15132 000000 TMP3 BSS 1

0306 15133 000000 TMP4 BSS 1

0307 15134 000000 TMP5 BSS 1

0308 15135 000000 SIZE BSS 1

# OF SECTORS PER DISK TRACK

0309 15136 000102 CW1 OCT 102

0310\*

## DISK BUFFERING ROUTINES

C311\* SUB TO READ INTERMEDIATE CODE FROM DISK BUFFER

C312\*

```

C313 15137 000000 READ1 NOP
C314 15140 015005X JSB EXEC
C315 15141 015150R DEF *+7
C316 15142 000054 DEF .1
C317 15143 015136R DEF CW1
C318 15144 100004C DEF BGNPG,I

```

FG 024

LN 0319 DEF BFRL

```

C319 15145 000000 DEF BFRL
C320 15146 015122R DEF TCNT
C321 15147 015121R DEF SCNT
C322 15150 127137R JMP READ1,I

```

C323\*\*

C324\* STORE INTERMEDIATE CODE AT VIRTUAL ADDRESS

C325\*\*

```

C326 15151 000000 DSTOR NOP
C327 15152 077123R STB TMP          SAVE A AND B
C328 15153 073127R STA TMP1        PROGRAM PARAMETERS
C329 15154 163151R LDA DSTOR,I
C330 15155 160000 LDA 0,I          GET VIRTUAL ADDR
C331 15156 037151R ISZ DSTOR        INCREMENT RETURN (P+2)
C332 15157 073133R STA TMP4        SAVE VIRTUAL ADDRESS
C333 15160 017213R JSB FNDPG        FIND DISK PAGE CORRES. TO ADDR.
C334 15161 066001C LDB PGPT1      BOTH CORE PAGES SAME?
C335 15162 056002C CFB PGPT2
C336 15163 027171R JMP DBLWR        YES, WRITE DATA TO BOTH
C337 15164 067127R LDB TMP1        NO, WRITE TO 1
C338 15165 174000 STB 0,I
C339 15166 067123R LDB TMP        RESTORE (A) & (B)
C340 15167 063127R LDA TMP1
C341 15170 127151R JMP DSTOR,I
C342*
C343 15171 062001C DBLWR LDA PGPT1  WRITE SAME INFO TO BOTH
C344 15172 003004 CMA,INA        PAGES
C345 15173 043133R ADA TMP4
C346 15174 042005C ADA PG1
C347 15175 067127R LDB TMP1        GET THE DATA
C348 15176 174000 STB 0,I        STORE IN FIRST PAGE

```

FG 157

LN 0349 ADA BFRL

```

C349 15177 042000 ADA BFRL        INCREMENT ADDR TO PAGE 2
C350 15200 174000 STB 0,I        INCREMENT ADDR TO PAGE 2
C351 15201 067123R LDB TMP        STORE IN SECOND PAGE
C352 15202 063127R LDA TMP1      RESTORE (A) & (B)
C353 15203 127151R JMP DSTOR,I

```

C354\*\*\*

C355\*\* READ INTERMEDIATE CODE VIRTUAL ADDRESS

C356\*\*\*

```

C357 15204 000000 DREAD NOP
C358 15205 077123R STB TMP        SAVE B
C359 15206 073133R STA TMP4      SAVE VIRTUAL ADDR

```

## DISK BUFFERING ROUTINES

```

C360 15207 017213R JSB FNDPG      FIND DISK PAGE CORRES. TO ADDR.
C361 15210 160000   LDA 0,I      PICK UP DATA AT VIRTUAL ADDRESS
C362 15211 067123R  LDB IMP      RESTORE B
C363 15212 127204R  JMP DREAD,I

```

C364\*\*\*

C365\*\* FIND AND LOAD DISK PAGE CORRESPONDING TO

C366\*\* VIRTUAL ADDRESS

C367\*\*\*

```

C368 15213 000000 FNDPG NOP
C369 15214 063133R  LDA TMP4      V.A. < END OF IM CODE STORAGE?
C370 15215 003000   CMA
C371 15216 042010C  ADA PBPTR
C372 15217 002020   SSA
C373 15220 027251R  JMP FND2    NO, SET POINTERS FOR PAGE 2
C374 15221 027242R  JMP FND1    YES, SET POINTERS FOR PAGE 1
C375 15222 063133R FND3  LDA TMP4
C376 15223 003000   CMA      VIRTUAL ADDRESS >=
C377 15224 042000C  ADA PGPTR      BEGINNING OF CURRENT PAGE
C378 15225 002021   SSA,RSS
C379 15226 017260R  JSB SWAP      NO, GET PROPER PAGE
C380 15227 063133R  LDA TMP4      YES, VIRTUAL ADDRESS >
C381 15230 003000   CMA      END OF CURRENT PAGE?
C382 15231 042000C  ADA PGPTR

```

FG 157

LN 0383

ADA BFRL

```

C383 15232 042000   ADA BFRL
C384 15233 002020   SSA
C385 15234 017260R  JSB SWAP      YES, GET PROPER PAGE
C386 15235 062000C  LDA PGPTR      NO, COMPUTE
C387 15236 003004   CMA,INA
C388 15237 043133R  ADA TMP4      CORE (DISK) BUFFER ADDRESS
C389 15240 042004C  ADA BGNPG
C390 15241 127213R  JMP FNDPG,I
C391 15242 062001C FND1  LDA PGPT1
C392 15243 072000C  STA PGPTR
C393 15244 062005C  LDA PG1
C394 15245 072004C  STA BGNPG
C395 15246 062004R  LDA PT1
C396 15247 072003C  STA PGPT
C397 15250 027222R  JMP FND3
C398 15251 062002C FND2  LDA PGPT2
C399 15252 072000C  STA PGPTR
C400 15253 062006C  LDA PG2
C401 15254 072004C  STA BGNPG
C402 15255 062005R  LDA PT2
C403 15256 072003C  STA PGPT
C404 15257 027222R  JMP FND3

```

C405\*\*\*

C406\*\* FIND AND LOAD DISK PAGES

C407\*\*\*

```

C408 15260 000000 SWAP  NOP
C409 15261 002400   CLA      INITIALIZE PAGE POINTER
C410 15262 073134R SWP1  STA TMP5
C411 15263 003004   CMA,INA

```

## DISK BUFFERING ROUTINES

```

C412 15264 043133R      ADA TMP4      VIRTUAL ADDR. > PAGE POINTER?
C413 15265 002020      SSA
C414 15266 027272R      JMP SWP2      NO, EXIT WITH ADDR
C415 15267 063134R      LDA TMP5      YES, INCREMENT PAGE POINTER

```

FG 158

```

LN 0416      ADA BFRL      BY BUFFER LENGTH
C416 15270 042000      ADA BFRL      BY BUFFER LENGTH
C417 15271 027262R      JMP SWP1      CHECK AGAIN

```

FG 159

```

LN 0418 SWP2 LDA BFRL      DECREMENT PAGE POINTER BY
C418 15272 062000 SWP2 LDA BFRL      DECREMENT PAGE POINTER BY
C419 15273 003004      CMA, INA      1 BUFFER LENGTH
C420 15274 043134R      ADA TMP5
C421 15275 073134R      STA TMP5      AND SAVE
C422 15276 062000C      LDA PGPTR      GET ADDRESS OF CURRENT CORE RES PAGE
C423 15277 017066R      JSB ACUN
C424 15300 015005X      JSB EXEC      RETURN TO DISK
C425 15301 015310R      DEF **7
C426 15302 000055      DEF .2
C427 15303 015136R      DEF CW1
C428 15304 100004C      DEF BGNPG, I

```

FG 159

```

LN 0429      DEF BFRL
C429 15305 000000      DEF BFRL
C430 15306 015122R      DEF TCNT
C431 15307 015121R      DEF SCNT
C432 15310 063134R      LDA TMP5      GET ADDRESS OF NEW CORE RES PAGE
C433 15311 172003C      STA PGPT, I      STORE IN POINTER
C434 15312 072000C      STA PGPTR
C435 15313 017066R      JSB ACUN
C436 15314 017137R      JSB READ1      FETCH PAGE FROM DISK
C437 15315 127260R      JMP SWAP, I
C438 15316 000000 SVOP1 BSS 2
C439 15320 000000 SVOP2 BSS 2
C440*****
C441*** SUBROUTINE DISK DOUBLE LOAD*****
C442*****
C443* PERFORM DLD ADR, I
C444*
C445* CALLING SEQUENCE: JSB DDLD
C446* DEF ADR
C447*
C448*****
C449*
C450 15322 000000 DOLD NOP
C451 15323 163322R      LDA DDLD, I      GET DISK ADR
C452 15324 160000      LDA A, I
C453 15325 012222R      AND INF      REMOVE V.A. BIT
C454 15326 073340R      STA VA      AND SAVE
C455 15327 037322R      ISZ DDLD      INCR RETURN (P+2)
C456 15330 017204R      JSB DREAD
C457 15331 073341R      STA SV.LO

```

## DISK BUFFERING ROUTINES

```

0458 15332 037340R      ISZ VA              INCR DISK ADR
0459 15333 063340R      LDA VA
0460 15334 017204R      JSB DREAD
0461 15335 064000      LDB A
0462 15336 063341R      LDA SV.LO
0463 15337 127322R      JMP DDLD,I          RETURN
0464*
0465 15340 000000      VA BSS 1
0466 15341 000000      SV.LO BSS 1

```

```

0468*****
0469*****SUBROUTINE DISK DOUBLE STORE*****
0470*****
0471*
0472*      PERFORM      DST ADR,I
0473*
0474*      CALLING SEQUENCE:      JSB DDST
0475*                               DEF ADR
0476*
0477*****
0478*
0479 15342 000000      DDST  NOP
0480 15343 104400      DST SVOP1          SAVE OPERAND
0481 15344 015316R
0481 15345 163342R      LDA DDST,I          GET DISK ADR
0482 15346 160000      LDA A,I
0483 15347 012222R      AND INF
0484 15350 073340R      STA VA              AND SAVE
0485 15351 037342R      ISZ DDST          INCR RETURN (P+2)
0486 15352 063316R      LDA SVOP1
0487 15353 017151R      JSB DSTOR
0488 15354 015340R      DEF VA
0489 15355 037340R      ISZ VA
0490 15356 063317R      LDA SVOP1+1
0491 15357 017151R      JSB DSTOR
0492 15360 015340R      DEF VA
0493 15361 104200      DLD SVOP1          RESTORE (A) & (B)
0494 15362 015316R
0494 15363 127342R      JMP DDST,I
0495*****
0496***      SUBROUTINE FETCH PARAMETER      ***
0497*****
0498*
0499*      FETCHES PARAMETERS AT ADDRESSES
0500*      EITHER ON DISK OR IN CORE
0501*
0502*      CALLING SEQUENCE:      JSB F/PAR
0503*                               DEF ADR
0504*
0505*      WHERE ADR IS THE ADDRESS OF THE PARAMETER POINTER
0506*
0507*****

```

## DISK BUFFERING ROUTINES

```

C508*
C509 15364 000000 F/PAR NOP
C510 15365 163364R LDA F/PAR,I
C511 15366 037364R ISZ F/PAR
C512 15367 160000 LDA A,I
C513 15370 070601 STA B GET PARAMETER ADDRESS AND SAVE
C514 15371 012222R AND INF
C515 15372 072367R STA P/ADR
C516 15373 006021 SSB,RSS
C517 15374 027400R JMP **4
C518 15375 017322R JSB DDLD YES, FETCH PAR FROM DISK
C519 15376 000367R DEF P/ADR
C520 15377 127364R JMP F/PAR,I
C521 15400 104200 DLD P/ADR,I FETCH PAR FROM CORE
      15401 100367R
C522 15402 127364R JMP F/PAR,I
C523 00367 P/ADR EQU MVIOC
C524* *****
C525* SUBROUTINE FLOATING ADD
C526* *****
C527*
C528* EXECUTE FAD ADR,I
C529*
C530* ADR= ADDRESS OF 2ND OPERAND. MAY BE
C531* IN CORE OR ON DISK
C532* CALLING SEQUENCE:
C533*
C534* JSB .FAD.
C535* DEF ADR
C536*
C537* IF BIT #15 OF ADR IS SET 2ND
C538* OPERAND IS ASSUMED TO BE ON DISK.
C539*
C540* *****
C541 15403 000000 .FAD. NOP
C542 15404 104400 DST SVOP1 SAVE OPERAND # 1
      15405 015316R
C543 15406 002400 CLA SELECT ADD OP.
C544 15407 017437R JSB ARITH GO DO IT
C545 15410 037403R ISZ .FAD. INCREMENT RETURN
C546 15411 127403R JMP .FAD.,I
C547*
C548* *****
C549* SUBROUTINE FLOATING SUBTRACT
C550* *****
C551*
C552* SEE FLOATING ADD FOR DESCRIPTION
C553*
C554* *****
C555*
C556 15412 000000 .FSB. NOP
C557 15413 104400 DST SVOP1 SAVE OPERAND # 1
      15414 015316R
C558 15415 060056 LDA .3 SELECT SUBTRACT OP.
C559 15416 017437R JSB ARITH GO DO IT

```

## DISK BUFFERING ROUTINES

```

0560 15417 037412R      ISZ .FSB.      INCREMENT RETURN
0561 15420 127412R      JMP .FSB.,I
0562*
0563*      *****
0564*      SUBROUTINE FLOATING MULTIPLY
0565*      *****
0566*
0567*      SEE FLOATING ADD FOR DESCRIPTION
0568*
0569*      *****
0570*
0571 15421 000000 .FMP. NOP
0572 15422 104400      DST SVOP1      SAVE OPERAND # 1
      15423 015316R
0573 15424 060061      LDA .6      SELECT MULTIPLY OP.
0574 15425 017437R      JSB ARITH      GO DO IT
0575 15426 037421R      ISZ .FMP.      INCREMENT RETURN
0576 15427 127421R      JMP .FMP.,I
0577*
0578*      *****
0579*      SUBROUTINE FLOATING DIVIDE
0580*      *****
0581*
0582*      SEE FLOATING ADD FOR DESCRIPTION
0583*
0584*      *****
0585*
0586 15430 000000 .FDV. NOP
0587 15431 104400      DST SVOP1      SAVE OPERAND # 1
      15432 015316R
0588 15433 060064      LDA .9      SELECT DIVIDE OP.
0589 15434 017437R      JSB ARITH      GO DO IT
0590 15435 037430R      ISZ .FDV.      INCREMENT RETURN
0591 15436 127430R      JMP .FDV.,I
0592*
0593*      *****
0594*      GENERAL ARITHMETIC SUBROUTINE
0595*      *****
0596*
0597*      EXECUTES AN ARITHMETIC OPERATION BETWEEN
0598*      DATA IN THE A & B REGISTERS AND DATA STORED
0599*      IN CORE OR ON THE DISK. THE RESULT IS RETURNED
0600*      IN THE A & B REGISTERS.
0601*
0602*      *****
0603*
0604 15437 000000 ARITH NOP
0605 15440 043504R      ADA .TADR      COMPUTE ADDRESS OF ARITH OP.
0606 15441 073467R      STA UPMOD      AND SAVE IT
0607 15442 063437R      LDA ARITH      GET ADDRESS OF
0608 15443 040046      ADA M5          PARAMETER
0609 15444 160000      LDA A,I        ADDRESS
0610 15445 160000      LDA A,I
0611 15446 002021      SSA,RSS      MAT. FLAG SET?
0612 15447 027453R      JMP ARITHU    NO, PROCESS NORMALLY

```



## DISK BUFFERING ROUTINES

```

C613 15450 012222R      AND INF      YES, 2ND OPERAND IS ON DISK
C614 15451 160000      LDA A,I      GET PARAMETER ADDRESS
C615 15452 027456R      JMP ARTH3    GO TO GET 2ND OPERAND
C616 15453 160000 ARTH0 LDA A,I      GET PARATER ADDRESS
C617 15454 002021      SSA,RSS      2ND OPERAND ON DISK
C618 15455 027460R      JMP ARTH1    NO, FETCH IT FROM CORE
C619 15456 017505R ARTH3 JSB FTHOP   YES, FETCH IT FROM DISK
C620 15457 027462R      JMP ARTH2
C621 15460 104200 ARTH1 DLD A,I      FETCH 2ND OPERAND FROM CORE
      15461 100000
C622 15462 104400 ARTH2 DST SVOP2    SAVE TEMPORARILY
      15463 015320R
C623 15464 104200      DLD SVOP1     GET 1ST OPERAND
      15465 015316R
C624 15466 127467R      JMP *+1,I   GO PERFORM OPERATION
C625 15467 000000 OPMOD NOP
C626 15470 016002X      FAD SVOP2
      15471 015320R
C627 15472 127437R      JMP ARITH,I
C628 15473 016003X      FSB SVOP2
      15474 015320R
C629 15475 127437R      JMP ARITH,I
C630 15476 016001X      FMP SVOP2
      15477 015320R
C631 15500 127437R      JMP ARITH,I
C632 15501 016004X      FDV SVOP2
      15502 015320R
C633 15503 127437R      JMP ARITH,I
C634 15504 015470R .TADR DEF OPMOD+1
C635**
C636***    FETCH OPERAND FROM DISK TO A AND B
C637**
C638**
C639***    ADDRESS OF OPERAND INITIALLY IN A REGISTER
C640**    PERFORMS FOLLOWING OPERATIONS
C641**      STA B
C642**      LDA B,I
C643**      INB
C644**      LDB B,I
C645**
C646**    ALL ADDRESS RELATE TO DISK BUFFER VIRTUAL ADDRESS
C647**
C648 15505 000000 FTHOP NOP
C649 15506 012222R      AND INF      REMOVE D.A. BIT
C650 15507 070001      STA B
C651 15510 017051R      JSB LDBI
C652 15511 073130R      STA IMP2
C653 15512 006004      INB
C654 15513 017051R      JSB LDBI
C655 15514 064000      LDB A
C656 15515 063130R      LDA IMP2
C657 15516 127505R      JMP FTHOP,I
C658**
C659**
C660 15517 000000 LDOP2 NOP

```

## DISK BUFFERING ROUTINES

|      |       |         |             |
|------|-------|---------|-------------|
| 0661 | 15520 | 063152R | LDA BIN02   |
| 0662 | 15521 | 002020  | SSA         |
| 0663 | 15522 | 027525R | JMP **3     |
| 0664 | 15523 | 160000  | LDA A,1     |
| 0665 | 15524 | 127517R | JMP LDOP2,I |
| 0666 | 15525 | 017204R | JSB DREAD   |
| 0667 | 15526 | 127517R | JMP LDOP2,I |
| 0668 |       |         | END ENTRY   |

PG 159

\*\*0007 ERRORS \*TOTAL \*\*RTE ASMB 92067-16011\*\*